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THE CONDOR

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MASSENA QUAIL

CYRTONYX MONTEZUMAE

One-third natural size

Painting by Andrew Jackson Grayson

THE CONDOR

VOLUME 54 JULY-AUGUST, 1952 NUMBER 4

SOCIAL BEHAVIOR IN NESTING CLIFF SWALLOWS

By JOHN T. EMLEN, JR.

Gregarious behavior in birds may be regarded as the result of positive social responses. Such responses are generally, if not always, balanced by negative social responses. The social behavior exhibited by a bird in any particular situation may thus be regarded as reflecting a balance of the two responses.

The social and territorial behavior of nesting Cliff Swallows (*Petrochelidon pyrrhonota*), one of the most colonial of passerine birds, was studied from this point of view during the summer of 1950 at fourteen nesting colonies in northwestern Wyoming. Facilities were provided by the Jackson Hole Research Station of the New York Zoological Society; financial assistance was provided by a grant from the Society. I wish to acknowledge with gratitude the cooperation given by Mr. James Simon and other personnel of the Station and the aid of Mr. Arnold J. Petersen, Dr. J. Paul Scott, Dr. Nicholas Collias, Dr. Joseph Hickey and Mrs. Margaret Hickey in the critical reading of the manuscript.

The foraging area and nesting sites of the four colonies studied most intensively are shown on the map (fig. 1). Colony A, the largest (130 nests), was situated beneath a series of concrete spans above the Jackson Lake Dam. Colony B (36 nests), a subsidiary of Colony A a few hundred yards to the north, was under a seven-foot concrete culvert. Colony C (91 nests), also a subsidiary of A, occupied the eaves of the water tower and neighboring buildings in the village of Moran. Colony D (18 nests), one mile north of the others, was in a five-foot concrete culvert. Flood plains over which the swallows foraged from these colonies were formed by the geologically recent recession of lake or river waters that has left flat expanses of heavy soil covered with sedges, grasses and willow scrub, or with lush wet hay fields of timothy, blue grass and sedge (fig. 2). Behind these plains the terrain generally rises abruptly to benches or to foothills covered with sage brush and lodgepole pine.

Intensive observations were begun on July 1 at the height of the laying period in the four colonies near Moran and were continued until the end of August by which time all the local breeding birds had left the area.

METHODS

All the 275 nests in the four colonies were numbered, and the history of each nest was followed and recorded in chart form. Experimental manipulation of nest contents was undertaken in one colony (C) which was early threatened by residents because it was considered a source of dirt and unpleasant odors. The colony ultimately was saved by the persuasions of the author. The results of these experiments are described in another paper (unpublished).

Studies of individual behavior were aided by observations on marked birds. Ninety-five adult birds were captured at their nests or netted at the entrances to the colonies for banding and marking. One hundred and forty-four nestlings were taken from their nests and marked. Marking consisted of a rather extensive spreading of acetone-base

lacquer paint, known commercially as airplane dope, on the remiges and rectrices as shown in figure 3. The objective in this type of marking was quick recognition of colony membership at considerable distances, and in this respect the technique proved highly successful. White, yellow and red painted birds from colonies A, B, and D and, to a lesser extent, green birds from colony C, could be quickly identified with the naked eye at 200 to 300 foot distances and often at much greater range. With seven-power binoculars, painted birds were often detected at distances where species identification was difficult. Paint was most clearly visible in birds flying against a dark background and could rarely be detected when they appeared as silhouettes against a light sky. Colors

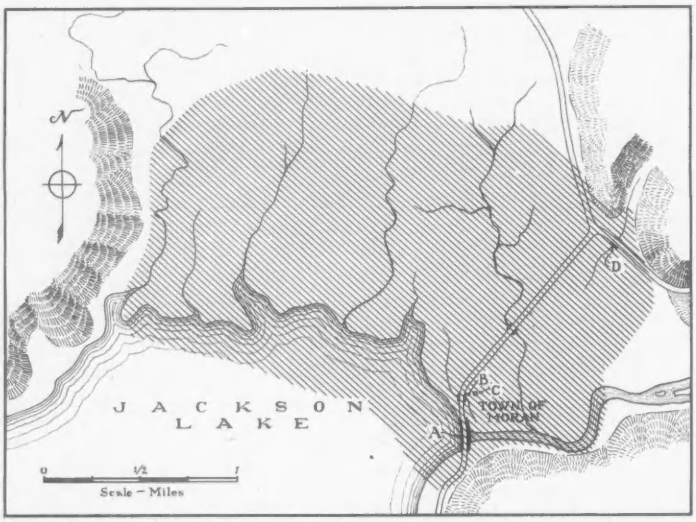

Fig. 1. Map of outlet region of Jackson Lake, Wyoming, showing the locations of the four Cliff Swallow colonies near Moran and the combined foraging range of the colony members (shaded areas).

on the alula, the outer primaries and the tertiaries were most conspicuous in perched birds although stains, made by acetone dilutions of the paint, on the underparts, rump and forehead were frequently of great help in the quick spotting of banded individuals among perched flocks. Forehead markings were most useful in nest observations. Special markings for individual identification were not attempted, but casual irregularities in painting were utilized in certain nest observations.

This extensive use of paint did not seem to hamper the birds in their flight, and the markings did not fade or deteriorate appreciably during the study period. Application of the paint was very time consuming, however. Each feather had to be painted individually with two coats and finally checked with a card or other separating tool to ascertain that it was free from neighboring feathers when dry. Even with the aid of a holding device, from 10 to 15 minutes was required to paint each bird.

Behavior was studied largely by direct observation with 7×50 binoculars. The birds were quite bold when the observer was quiet, and blinds were found to be unnecessary at the nesting colonies. A few planned experiments served to elucidate special aspects of territorial and flocking behavior.

Fig. 2. View of the foraging meadows of the Moran colonies from the northeast.

Fig. 3. An immature Cliff Swallow showing the pattern of paint used for distant recognition of colony origin.

CALL NOTES AND FLOCK INTEGRATION

Call notes feature importantly in the social integration of Cliff Swallow flocks, and a brief description of their characteristics is necessary background for discussions of social behavior. Three main types were observed: (a) "conversational" notes apparently functioning in general flock integration; (b) "defiance" calls, including the so-called "song," uttered in connection with territorial and aggressive displays between flock

members; and (c) "alarm" calls uttered at times of disturbance or threatened danger.

Conversational calls were given with considerable frequency by flock members in flight, at rest and particularly when approaching or leaving the nest, apparently in response to the social stimulus of flock companions. They consisted of harsh low chirping notes, given with a variety of inflexions and modulations, according to the situation. The most frequent form was a low *kersh*; when excited the pitch was raised and the calls repeated as *ash ash*. These calls appeared to have value in keeping the flock together during foraging and other activities. When used in the nest between members of a pair, the call was reduced to a soft short *krsh*.

The main "defiance" call or song was characteristically given by individuals sitting at the nest entrance or on an established perch, but it was occasionally uttered by a flying bird in a circling flock. It consisted of a series of high thin squeaks and low gutteral gratings alternating in an extended song which often lasted for six or eight seconds. The head during utterances of this song was characteristically lowered, the bill slightly raised, and the throat feathers extended. When given by flying birds the tail was also spread and the wings dropped and moved with short quivering beats. Although generally given in response to the approach of other birds, this defiance song and display was also given by aroused territorial birds at their nest sites in the absence of other swallows, apparently as a type of possessional or territorial announcement. It almost invariably served to elicit aggressive responses from neighboring individuals and for this reason should probably not be regarded as a threat call; at least it failed to function in repelling intruders. A direct form of threat at close quarters consisted of stretching and snapping, or sometimes of bowing and gaping in a posture suggestive of the food begging behavior of fledglings.

The alarm call, given by colony members on the approach of an enemy or other disturbing factor at the colony or roost, consisted of a clear plaintive *zeoo* with a descending inflexion. This was uttered singly or, when the disturbance appeared suddenly, in a series of three or four calls. Loudness and pitch also seemed to vary with the degree and imminence of the potential danger. Birds in their nests responded promptly to this call by presenting their heads at the entrances. A whistled imitation of the call thus proved useful in checking the occupancy of nests. If given near a perching flock, the call typically precipitated a sudden departure of all but a few members. Soft low calls of this type were occasionally heard from foraging flocks, their function and significance at this time being obscure.

The food begging call of the young both before and after leaving the nest consisted of a rather high shrill *pleet* or *pleetcet* and was a characteristic feature of postnesting flocks during August.

POSITIVE SOCIAL RESPONSES

All or nearly all the ordinary activities of Cliff Swallows were performed in groups, and positive social responses were readily seen on the loafing perches, at the foraging areas, at mud and grass-gathering areas, and at the nesting colonies.

Gregariousness at the loafing perches.—Large flocks of resting swallows lined up along telephone wires or on the branches of trees are a familiar sight to ornithologists (fig. 4). Loafing flocks are characteristic of the breeding season as well as of the postbreeding and migration periods. During the nesting season at Moran, groups were limited in size by the number of breeding birds in the local colonies. Late in July they increased rather suddenly as the local young fledged and joined their parents. A week or two later the flocks either left to join other colonies, or grew rapidly with the acquisition of foreign membership.

Starting about sunrise a large portion of the local adults accumulated in protected sunny situations near the colonies for an hour or so of sun-bathing and preening. Narrow ledges of trimming on the east face of a white painted house near colony C was the favorite site at Moran. Some birds came directly from their nests in colonies A. B, C and D (the latter one mile distant); others flew in from the lake or from nearby meadows apparently having made a flight first. The scarcity of fecal droppings on and below the wall suggested that little prior feeding had been done.

Telephone wires were the commonest perching sites for loafing swallows after seven o'clock in the morning. Habit seemed to be involved in the selection of loafing areas, for out of the many miles of wires accessible to the birds, a few limited regions, com-

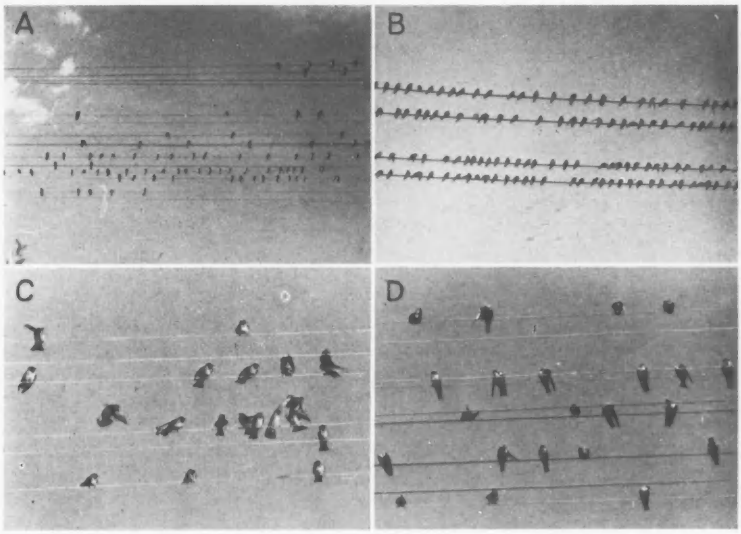

Fig. 4. Swallows on telephone wires. A, normal spacing of Cliff Swallows (Moran, Wyoming); B, normal spacing of Purple Martins (Madison, Wisconsin); C, group fighting of Cliff Swallows in response to singing on the wires; D, preening.

prising three or four sections of wire each, were characteristically used day after day. These were in relatively undisturbed areas affording clear vision for at least 100 feet. The observer was unable to detect any peculiar features of the favored sites over many unused sections of wire. Central location with respect to the main colonies was obviously involved, but birds from colony D, one mile distant, passed thousands of feet of good perching wires to join the group at Moran. Within the limited perching areas, the portions selected for use on any one occasion commonly varied from day to day and from hour to hour by as much as several hundred feet. On any single occasion the first bird or birds to alight seemed to form a focus of attraction for those that followed.

Birds of both sexes and from all of the four local colonies mingled freely in the loafing groups, coming either directly from their nests or straggling in from the foraging grounds. Cliff Swallows from distant colonies and swallows of other species also associated freely with the local birds in these groups. Most of the birds on the perches at

any one time were either resting, often with the bill turned back beneath the scapulars, or preening. Preening was usually vigorous and sometimes continued for as much as six or eight minutes without pause. Perhaps this preening was a type of displacement activity, a formalized behavior response to a tension resulting from the interplay of positive and negative drives as has been suggested for similar behavior in the Common Tern (*Sterna hirundo*) by Palmer (1941:100). It was often indulged in by isolated perchers, however, with nearly if not quite as much vigor as grouped birds. The activity seemed to spread through a flock by contagion so that the per cent actively preening at any one time was commonly either high or low (fig. 4). Single individuals seldom remained on a perch for more than five or ten minutes so that there was a continuous reshuffling of birds. In general the flock would tend to grow slowly for from 5 to 20 minutes as arrivals outnumbered departures. This might continue until one hundred or more birds were present. By this time an alarm call would be sounded by one of the birds and nearly all the flock would swing off, circling irregularly while the perching aggregation slowly reassembled.

The rate of accumulation of birds in the loafing flocks and the selection of perches with respect to the other birds was studied with the hope of learning more concerning the social forces involved. On arriving a bird would select a perch anywhere from 4 inches to 10 feet from the nearest percher. The 4-inch distance was commonly selected even when the flock was sparse, and the number of such close spacings seemed to be roughly proportional to the size of the perching flock until a high level of crowding had been reached when the filling of 8- to 10-inch spacings rapidly increased the ratio. Spaces up to about 30 inches were commonly filled centrally, the arriving bird choosing his central position with considerable accuracy.

In one place where a one-hundred-foot stretch of telephone wires and a half-dead aspen tree provided a perching area for a flock of about 140 swallows, the area was divided optically into five 20-foot sections and the numbers of birds on the three central and most heavily used sections counted at one minute intervals. Each time after being flushed the birds returned to the three central sections and occasionally to the terminal sections and the tree which lay within the west terminal section. The results of seven series of counts representing seven successive aggregations at this location on the morning of August 4 are shown in figure 5. In all these series the middle section attracted swallows most rapidly and eventually acquired the largest number. When the terminal sections were both used by birds, as in series 3 and 4, the center of balance of the group remained in the middle section. When the east terminal section was used, however, and not the west, as in series 5, the center of balance was shifted to the east. From these observations we may infer that central positions in an assembling flock were favored.

Although a perching flock clearly served to attract further members, density of grouping appeared to add an increasing element of instability into a resting assemblage and clearly had an inhibitory effect on perch selections at higher levels of density. A single bird or small group, as already noted, commonly served to decoy others of its own or related species. The first ten or twenty birds to arrive at a loafing site, however, generally dispersed themselves over most of the area eventually occupied by the whole assemblage. Growth then proceeded by intussusception rather than by accretion from a few focal points. In one observation on July 20, where a flock started to assemble at two points one hundred feet apart along a telephone line, the larger and denser group of 25 attracted 20 new recruits while the smaller group of 10 attracted 16. At higher density levels an inhibitory effect becomes apparent. In series 3 and 4, of figure 5, where accumulations at the perching area continued until the flock was largely settled, birds eventually stopped alighting in the densely populated central section and selected

perches in the peripheral areas. There was even a decline in the number of birds in the central section while the lateral sections continued to grow. That this decline occurred in series 4 at a level only about half that reached in series 3 suggests that this density response is to relative rather than to absolute crowding. An absolute crowding limit of approximately 50 birds in 20 feet, imposed by individual tolerance limits, is discussed in the next section of this paper.

Bank Swallows (*Riparia riparia*) and Tree Swallows (*Iridoprocne bicolor*) joined the Cliff Swallows on their roosts even before the young had hatched, and later the perching groups also included Barn Swallows (*Hirundo rustica*), Rough-wings (*Stelgidopteryx ruficollis*) and Violet-greens (*Tachycineta thalassina*). All species intermingled freely and each appeared to function in attracting others regardless of species. Immature birds tended to be dispersed peripherally in mixed flocks as did members of less numerous species.

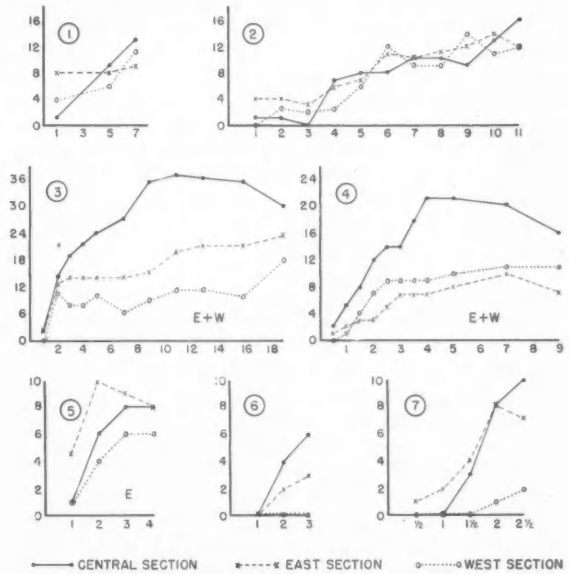

Fig. 5. Rate of accumulation of swallows in successive perching groups on telephone wires; August 4, 1950. The horizontal scale of each graph represents time in minutes, the verticle scale, numbers of birds on the wires.

Gregariousness on the foraging areas.—Throughout the nesting period the birds spend much of their time on the wing, feeding, gathering flying insects for the nestlings, drinking and bathing over the surface of a lake, or in activities which I tentatively interpreted as flight play. These activities in the vicinity of Moran were performed in July in loose flocks of from 25 to several hundred birds with members of the four local colonies all represented and freely interspersed. Later in the season the flocks increased in size as fledged young and swallows of other species, particularly Bank Swallows, joined the ranks and merged almost completely into the foraging groups.

Much of the foraging was done locally within a quarter mile of the nesting colonies,

but large elements of the population tended to drift away as a group, especially during the warmer parts of the day, to foraging grounds as much as four miles distant. Before the start of incubation these excursions, as noted by Buss (1942:158) and Pettingill (personal communication), often involved the entire nesting group, the colony site being completely deserted for as much as four or five hours at a time.

Later excursions were no less extensive, but many birds remained behind at the nests, and a nearly continuous stream of birds flowed back and forth between the colony and the foraging grounds of the moment, as mates exchanged duties at the nest or returned with food for the young. Birds flew directly in these shuttling flights, in so far as swallows ever fly a direct course, at speeds which averaged about 100 yards in 10 seconds or one mile in 3 minutes.

When on the foraging ground most of the birds at any given moment were aggregated in a single foraging unit. Storer (1927:107) noted this group-foraging phenomenon at a large colony in California, and Buss (1942:158) observed several manifestations of it at a colony in Wisconsin. Foraging flocks were loosely formed, each bird circling and darting about in an independent manner and showing none of the nice integration of movement to be seen in pigeon or shorebird flocks. A group would characteristically spread over from 2 to 5 acres when feeding low over the grass meadows. At times there seemed to be a pattern of circling either clockwise or counterclockwise, but within a few minutes this pattern would be lost in irregular maneuvers. The effect was usually a maelstrom of criss-crossing flights. Flock integrity was apparently maintained by the tendency for individual birds to turn and circle back as they found themselves pushing out beyond the main body of foraging birds. The nearly continuous flow of birds arriving from and departing to the colonies at times created a confusion which might have obscured the nature of these circumscribed foraging flocks had not the presence of color marked individuals revealed the identity and destination of birds which could otherwise have been interpreted as irregular stragglers.

A foraging flock rarely maintained a static position over a meadow for more than a few minutes. It would typically drift, sometimes so slowly that the movement would be noticed only with prolonged observation, occasionally quite rapidly, but never as a single directed flight participated in by all members.

This drifting of the flock as a unit over a varied terrain resulted in a progressive shifting of flock activity and a striking unanimity of behavior. Thus a large contingent of the local population became collectively engaged first in feeding, then in drinking over the lake, then in mud gathering, as noted in the next section, then in loafing, to produce a synchrony and unanimity of activity which was conspicuous whether the observer was located at a distant foraging ground or among the nests in the colony. Observing at the nesting colonies, the writer at first misinterpreted this behavioral conformity of the flock as the result of contagious responses to the activities of birds at neighboring nests.

During the warmer hours of the day, foraging flocks often operated high above the meadows, at heights estimated at 500 to 1500 feet, possibly in response to the diurnal movements of flying insects. A few soft call notes from the sky often called attention to these flocks, circling irregularly almost beyond the range of human vision. At such times flock unity seemed less developed, and the area or space occupied by a group at a given moment might be many times that used when the flock was near the ground. Looser organization and less regularity also seemed to obtain late in the season when the flocks had been augmented by immatures and by swallows of other species.

More tightly intergrated flocks sometimes formed for late evening maneuvers prior to night roosting and again in the early morning. Non-breeding birds and birds with

incompleted nests were active participants, moving off after the maneuvers to roost in a body at some distance from the colonies. Nesting birds were also involved, however, and the flights generally took place over or near the nesting places.

All participants, sometimes several hundred individuals, would unite to circle and wheel in a whirlpool of swirling birds suggestive of the pre-roosting flights of the Chimney Swift (*Chaetura pelagica*). It was impossible to determine whether the birds were feeding, but the whole procedure was suggestive of a social rather than a foraging activity. Occasionally a flock would split briefly, or a small group, leading off in a new maneuver, would fail to draw the main body of birds with it; but stragglers were few and the total effect was that of a cohesive aggregation.

Gregariousness at mud- and grass-gathering areas.—The gathering of mud and of grass for the nest was a major activity of Cliff Swallows during the nest building phase of the breeding cycle and irregularly thereafter as nests needed repairing. Mud for the nest shell was gathered at rain puddles or along open muddy banks of lakes, streams and sloughs and carried as small pellets in the bill to be added to the nest rim. Grass for the lining was collected in exposed dry spots where the stand was sparse and the grass texture fine.

Mud and grass gathering were highly social activities. All participating birds typically concentrated their activity on one or two areas of a few square yards regardless of the extent of suitable facilities in the neighborhood. From ten to thirty birds might be clustered together in this limited area while dozens more were shuttling back and forth to the nests. Each bird appeared to work independently, holding its wings high above the back and fluttering them as it pecked repeatedly until a large beakful had been secured (fig. 6A, B). Both members of a pair participated and characteristically exchanged places at the nest with each return. Collecting the mud usually required 15 to 40 seconds and placing it on the nest from 30 to 40 seconds. The time required to make the commuting flights was determined by the distance, being about 10 seconds for every 100 yards.

On the ground the group worked actively and often ignored the careful approach of an observer. All responded quickly, however, to an alarm call from one of their members and would frequently rise and wheel off even at imaginary disturbances. If the interruption was brief the birds returned, but if they were unable to return within half a minute or so, the sequence was broken and the birds shifted to another site or temporarily abandoned their mud gathering and moved on to other activities. A few sites were used repeatedly, but there was much irregularity in this respect, and it was impossible to predict where the group might gather the next time.

As in other social activities, members of all four local colonies at Moran mingled freely at the mud- and grass-gathering sites. The birds ordinarily worked side by side only a few inches apart regardless of colony membership and with little evidence of intolerance. Fights occasionally occurred, however, one bird deliberately alighting on another, grabbing it by the head or neck feathers and tenaciously holding on for 8 or 10 seconds (fig. 6C). Often these encounters resembled brief and incomplete copulations.

A striking feature of mud-gathering activity was the simultaneity of its occurrence among the members of a colony. Nest building with mud is of necessity intermittent, extended interruptions being required for the fresh construction to harden before new increments can be added (Buss, 1942:156). A definite synchronization of mud-gathering activity was repeatedly noticed at the colonies under study, apparently attributable to the flock foraging behavior already described. This synchronization was most striking after the eggs had hatched and mud-packing behavior occurred only irregularly as nest repairing. Among the incessant flow of adults arriving with food for their young, one

bird would appear with a pellet of mud; a minute later others would be doing the same and within two or three minutes all birds would have switched from food gathering to mud packing. Nestlings gaping for food were ignored as the parent busily entered, then turned back to place its load of mud at the nest rim. For ten to twenty minutes nearly all the active birds would be packing mud, and then quite suddenly, this would stop and the birds would switch to another activity. The strength of the stimulus to pack

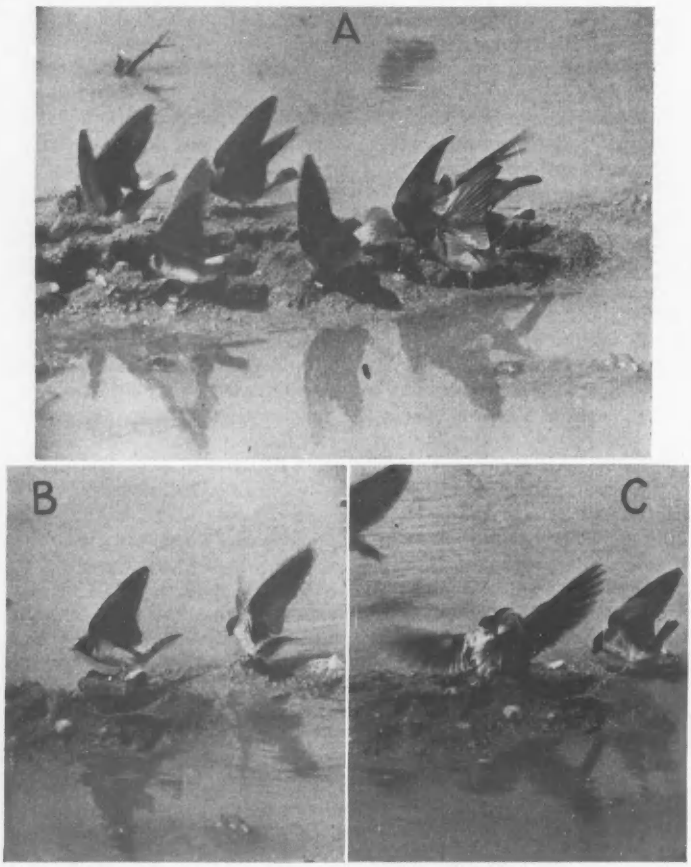

Fig. 6. Cliff Swallows gathering mud. A, B, typical grouping and postures; C, a fight.

mud, once the pattern had been set for the colony, is strikingly shown by the behavior of certain non-nesting birds and birds with completed nests that were repeatedly seen to pack mud to the colony and attempt to place it on nests other than their own. Before the writer was aware of this phenomenon he used the growth of nests as circumstantial evidence of their occupancy, but later he found that abandoned nests and even old shells from a previous year would occasionally have mud added to them during periods of mud-gathering activity in a colony.

Gregariousness at the nest sites.—Cliff Swallows are one of the most social passerine birds in their nesting activities. Nests are typically grouped in well defined colonies situated under overhanging cliffs, or, more commonly, under the protecting eaves of buildings, bridges and other man-made structures. They may be built as separate units in the larger spacings but often are merged into double nests, long rows or extensive masses (fig. 7A, B). The fourteen colonies under investigation at Moran varied in size from 18 to 178 nests. Colonies as large as 2000 nests have been described for the species (Buss, 1942). One cluster examined in a colony under a bridge at Elk Antler Creek in Yellowstone Park 76 miles north of Moran contained 900 nests merged into one mass.

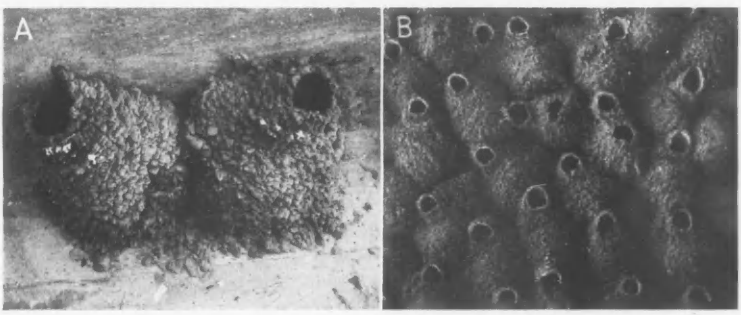

Fig. 7. Groups of nests of Cliff Swallows in a colony. A, contiguous nests showing flaring position of openings when nests are placed close together. B, a massed group attached to the ceiling of a concrete culvert, showing spacing of nest openings; two nests have breaks which should not be confused with natural openings.

When suitable sites are present, colonies commonly are subdivided or have scattered groups of nests at various points within a half mile or so of the main unit. Several of the colonies under observation had 4 or 5 semi-isolated subsections or peripheral subcolonies. The three nesting groups at Moran (A, B and C in fig. 1) and possibly also the fourth (D) should perhaps be considered as subgroups rather than as distinct units. In one case a single isolated nest was built late in the season nearly a mile from the nearest colony.

The members of these subdivisions and subcolonies apparently merge completely with birds from the parent colony as single social units. No intergroup antagonism was detected between the colonies at Moran (A, B, C and D in fig. 1) and one bird from colony A was observed perching peacefully among the members of the Elk Ranch Colony five miles away on August 4. Colonies would thus appear to be essentially open societies.

Although the start of nest building was not observed in this study, an examination of laying and hatching dates and of other signs of the stage of progress at individual nests revealed that there was a general synchrony of the cycle in the members of any single colony, more than would be expected to result from independent responses to seasonal and weather factors by the individuals (table 1). Thus all the birds in colony B in 1950 hatched their eggs between July 6 and 11. The bulk of the nests at the dam (colony A) hatched at the same time or perhaps a day earlier, but here there was a second, delayed, group which reached the same stage 10 to 12 days later. Most of the birds at the tower (C) and on the cabins nearby paralleled this second nesting group,

but a smaller number at the tower nested as a separte group about six days later. Observations by A. J. Petersen (personal communication) in 1949 (table 1) provide further evidence that each colony has an independent synchrony within itself. It would thus appear that social forces are involved in the determination of nesting dates and that each individual in a colony is influenced in its breeding schedule by its associates. This might be interpreted as an example of the "Darling effect" in which social forces acting through sensory channels influence the physiological mechanisms of flock members in such a way as to produce a parallel development of the reproductive tract and of reproductive processes (Darling, 1938). Further observations on pairing behavior at the nests (unpublished manuscript), however, indicate that the synchrony in some cases at least,

Table 1

Hatching Dates at Cliff Swallow Colonies*

1949

Colony	July 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
A				x	x	x	x	x	x																				118
B					1			1	**7**	**12**	**5**	**5**	2	3	2			1										1	42
C											x	x	x	x	x	x													50
D																			x	x	x	x							22
5 mi. E			x	x	x																								18
6 mi. E		x	x	x	x																								125
7 mi. E																		x	x	x	x								52
22 mi. E									x	x																			150

1950

A				x	x	x	x	x	x	x				x		x	x	x		x		x							130
B					3	**9**	**8**	**5**	4	3																			36
C												1	1	1	**7**	**7**	**6**	**10**	2	2	3	**8**	**5**	3	1				91
C′															x	x	x	x												30
D							**2**	**2**	**1**	**2**				1	**2**	**2**	1													18

* Colonies as designated on map (fig. 1) or in miles from Moran. Numbers indicate number of nests examined which reached the stage on date indicated; an x indicates computed hatching dates in colonies with inaccessible nests. Bold face type denotes main hatching period for each colony. Totals indicate number of nests in colony. Data for 1949 from notes of A. J. Petersen.

was due to mass occupancy of a colony site followed, after about a week, by the withdrawal of those prospectors which had failed to establish territories and construct (or occupy) nests. Second attempts by these unsuccessful birds were subsequently made in similar mass clusterings at new sites peripheral to the established groups or at some distance from them.

The position of a nest in a colony was correlated with the stage of the reproductive cycle of its owner. Twenty of the 32 nests classified as belonging to the late hatching group at the Moran Dam were peripherally located while 86 of the 98 assigned to the early group were situated well back under the overhang. Correlations between position of nest and stage of progress were vague at the other colonies because of the small size of the nesting groups and because of the close synchronization obtaining. It was clear at the tower colony and at Uhl Hill, however, that where double rows of nests occurred, or where single nests were placed below the main row, the lower nests lagged behind. Six late nests at the Elk Antler Creek colony in Yellowstone which still contained young on September 1 were all located in the lower tier or peripherally on the ceiling of the bridge. Thus, as in Darling's gulls (*op. cit.*), the first birds tended to select central sites while later arrivals built peripherally.

An important consideration in interpreting these data on the Cliff Swallow is that old nests in reasonable repair are patched up and re-used year after year. Thus, in a well protected site like the Moran Dam, centrally located nests may be more sheltered

against winter damage and consequently in better condition for reoccupancy by dominant or aggressive birds the following spring. Whether it be this or a straight matter of selection of centrally located sites by the first comers, the principle of peripheral lag applies and indirectly reflects a preference for central positions which may perhaps be compared with the preference for centrally located loafing perches noted earlier.

Darling (*op. cit.*) has noted that size of colony and position in the colony may affect nesting success. Unfortunately no comparable observations were made on the Cliff Swallows in the present study. It was noted repeatedly, however, that visits to the nests caused more disturbance in small than in large colonies. The owners of the isolated nest mentioned above were particularly perturbed by the observer's presence and gave the alarm call almost incessantly during his visits. The same excitability was conspicuous among late nesters after the majority of a colony had dispersed with their young. Such behavior suggests that flock association in nesting imparts a certain stability for the group members.

Unified group responses of a contagious nature leading to mass desertion of the colony, such as have been reported for the Tri-colored Blackbird, *Agelaius tricolor,* (Lack and Emlen, 1939:228) were not encountered. In none of the numerous cases of nest disturbance and nest abandonment did neighboring pairs respond; in two colonies where the majority of the nests were destroyed early in the season, the remaining pairs persisted. A temporary abandonment, en masse, of several colonies on the Buffalo Fork at the time of a cold, rainy spell on July 10 and 11 may have had an element of contagious behavior in it, but since all of the small minority of birds which had eggs at the time remained, the mass movement is interpreted as largely a summation of individual responses.

SOCIAL TOLERANCE LIMITATIONS

The negative social responses or expressions of individual independence which limit and regulate flocking behavior are clearly manifested yet spatially restricted in the Cliff Swallow. They can best be seen when the birds are at rest and are consequently considered in the following pages as they occur at (a) the loafing perches and (b) the nesting sites. Outbreaks of the grating song suggesting self assertion and defiance and instances of conflict were noted in foraging flocks and at mud- and grass-gathering sites (fig. 6C), but their significance at these times could not be interpreted.

Intolerance at the loafing perches.—Cliff Swallows when perched in linear arrangement along wires, ledges or branches, dispersed themselves so that there was a space of at least 4 inches between birds (fig. 4A). Allowing one inch as the breadth of a perching bird, this means a maximum of one bird per 5 inches of wire or 24 birds in 10 feet. This general rule of spacing also applies in the irregular branches of trees, on flat roofs or where a group of parallel wires adds a third dimension to the spatial arrangements of the flock.

Observations on the selection and maintenance of positions by birds in a loafing flock suggest that this spacing is a reflection of individual intolerance of crowding and that the size of the intervals between birds is related to the distance a bird can strike without shifting its feet. Swallows have weak feet and ordinarily do not walk or shift their position once they have settled. The defended zone is thus restricted by the size of the bird and the extent of its reach from a fixed position. Breeding Bank Swallows were observed to have similar restrictions to crowding on the loafing perches, commensurate with their slightly smaller size. The principle must be extended with caution, however, for other species including the Purple Martin (*Progne subis*) tolerate considerably closer spacing (fig. 4B).

New arrivals typically selected positions 4 inches or more from the nearest perching bird, and, as already noted, often chose perches midway between two resting swallows as though recognizing and respecting certain tolerance limitations. At such times no reaction was evinced unless the distance to the nearest bird approached the tolerance limit. When this occurred the incumbent might threaten with a brief grating squeak, or lower its head and snap before settling back to rest or preen. Occasionally a new arrival would attempt to squeeze into a 6- or 7-inch space, or would deliberately alight on or next to another bird (fig. 4C). Such situations were invariably followed by threats, scuffles and the retreat or departure of one of the birds. The aggressor in these encounters might be neither the new arrival or the incumbent. The new bird often withdrew even before alighting, to flutter off and try another place. At other times it would perch but remain in a tense upright posture with feathers compressed as one or both of the neighbors challenged its position. Occasionally it assumed a more aggressive attitude and attempted to dominate the neighbor either directly and aggressively (antisocial behavior) or hesitatingly and cautiously, taking advantage of the neighbor's preoccupation with preening or sunning. Such birds would often sidle clumsily along the wire, advancing and retreating as they challenged the incumbent. These approaches were successful in a few cases, but more often the challenger retired after 10 to 20 seconds.

Tolerance limits seemed to be the same for all individuals regardless of relationship or colony membership. Aggressive displays were repeatedly noted both between members of the same breeding colony and between members of different colonies. In one case the two contestants were apparently mates.

Young swallows after joining the adults on the loafing perches were still begging for food. The active gaping reactions of these birds toward their parents and at times toward other adult Cliff Swallows, other fledglings and even toward Bank Swallows, were difficult to distinguish from attitudes assumed in true aggressive behavior, indeed they may have had a considerable amount of the aggressive element in them. Parents generally responded by feeding, but when they had no food at hand, backed off and retreated before the aggressive advances of the young. Food begging by one young bird of another young sometimes resulted in a mutual display of gaping which subsided only after the birds had separated to a distance of 3 or 4 inches. Young swallows often approached others of their kind and even adults, pulling at wings, tails or head feathers. The victim of these advances either ignored them and waddled away, threatened with open bill, or even attacked. One such encounter was observed between a young Bank and a young Cliff Swallow, the former taking the initiative, the latter the successful defensive response.

Intolerance at the nests (territorial behavior).—Social tolerance limitations at the nest sites were similar to those observed at the loafing perches. Each individual defended the area within the reach of its bill against all intruders except the mate. The defended area at the nest, however, was fixed in position and thus assumed the characteristics of a breeding territory as generally defined.

An examination of the distribution of nest openings, in a colony even where nests were massed irregularly, revealed that neighboring nests rarely had their entrances closer than 4 inches unless the position and direction of the entrance tunnel was such as to shield the owner from birds perched at the entrances of neighboring nests. Two nests built together as a pair typically had the flaring form seen in figure 7A, and in larger groupings irregularities in form could often be correlated with the position of neighboring entrances as they existed or had existed during construction. "Growth" lines produced by the successive additions of mud to the nest rim during construction

were readily detectable in most finished nests and provided clues on irregularities in the course of construction.

Song and threat displays were repeatedly in evidence at the nest site especially during nest construction. A bird, when it was not actually packing or adding mud to the structure, sat on the ledge of the incompleted nest following the movements of each

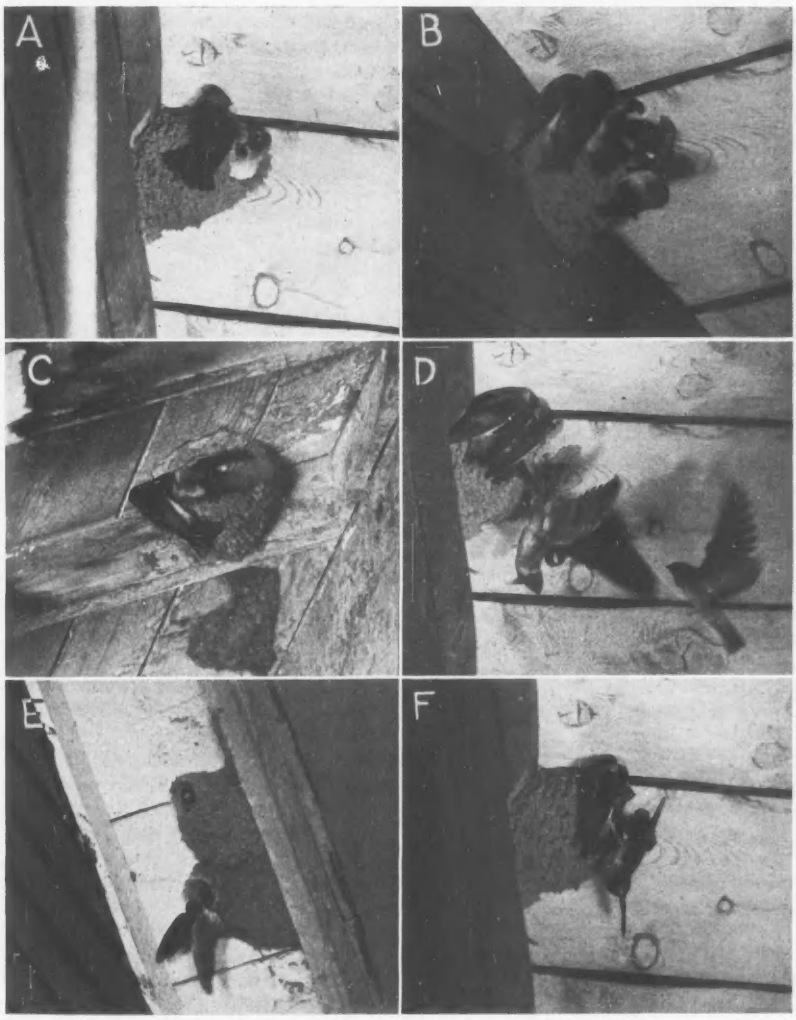

Fig. 8. Defense of the nest (for interpretations of actions, see text). The birds on the side of the nest in A, B, D and F were a pair starting a new nest at that point; residents of the nearly completed nest threatened and attacked these encroachers whenever their heads came within reach.

passing swallow and threatening those that came close (fig. 8A). Song attracted rather than repelled intruders and it was not uncommon to see from one to three or four birds hovering and alighting at the nest entrance of a singing defender. The usual sequence was: (1) a bird would approach and deliberately alight at the nest rim, leaning far back so as to avoid the blows of the resident (fig. 8B). (2) The resident, singing continuously and vibrating half-closed wings, would threaten and jab at the intruder's head which was kept just out of reach. (3) The intruder would give up and fly off after a few minutes. Any bird which came within reach was vigorously evicted (fig. 8C, D). Intruders apparently never took the aggressive in these fights but often showed great per-

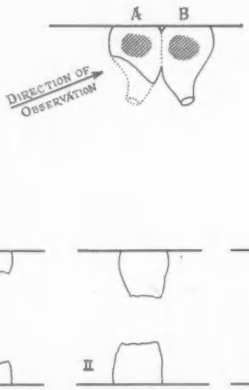

Fig. 9. A, B. Twin nests experimentally interconnected by breaking the intervening partition. The outer part of nest *A* was broken away to permit observation of nest interiors. Outlines of original structures indicated by dotted lines.
I, II, III. Three stages of growth in a pair of opposing swallow nests.

sistence (fig. 8E). Occasionally an intruder would succeed in actually entering a nest whereupon the defender would grab it and the two would scuffle and twirl in the nest for up to a minute before tumbling from the entrance still locked in combat. Usually they parted after falling a few feet but on one occasion they were seen to drop together into the water four feet below and then separate and fly off. Not infrequently one bird, presumably the resident, would be seen leaning from the nest entrance, suspending another bird from its bill by the head, neck or body feathers (fig. 8F). The latter, on release, would fly swiftly away uttering the conversational chirping note, or occasionally a subdued cry suggestive of the alarm call. At times the fighting would continue after the intruder had been evicted, taking the form of a chase, especially if the intruder persisted in returning to the nest for repeated assaults.

Territorial threat and fighting were most frequent at partially built nests where a wide entrance meant a relatively large area to defend or close approximation of neighboring entrances and many avenues of approach for intruders. That it was this that occasioned the fighting rather than the attainment of a particular stage in the breeding cycle is indicated by the prompt reappearance of intrusion and fighting at nests which had been broken back by the observer. The completion of a narrow tunnel entrance apparently served to reduce the occasion for quarrelling at the nest.

At one colony the formation of the eaves structure on a barn roof created a situation which led to increased rather than decreased conflict as nest construction advanced (fig. 9, I-III). Vertical surfaces on both borders of an 11-inch eave provided support for two facing rows of nests. At early stages of nest construction the space between the rows was adequate (fig. 9I), but as the building progressed the openings inevitably approached each other (fig. 9II). Fighting at this time became frequent and intense and, when the opponents were absent, the birds were repeatedly observed to lean from their own nests and peck fragments from the rim of the opposing nest. When the space between pairs of opposing nests had been narrowed to about two or three inches, alighting at the entrances invariably led to fighting. Both members of each pair sang almost without interruption, and irregular visiting contributed to a picture of general confusion. On one occasion a bird from one nest was seen to reach across and grab a bird from the opposite nest; a struggle ensued in the first nest followed by a tumbling fall as the two, locked in combat, dropped between the nests. The following day the quarrel had been largely resolved with the completion of entrance tunnels which turned to right and left so as to effect the necessary separation of the openings (fig. 9III).

The various observations lead to the hypothesis that the peculiar form of the Cliff Swallow's nest is a special adaptation for the intense localized type of territorial behavior associated with colonial nesting in the species. The walls of the structure apparently serve as a protecting shield against interference by other birds and thus reduce the occasion for fighting and contribute to the tranquility and stability of the colony. By completely surrounding the nest cup on all but one side, these walls may be regarded as enclosing the territory with a solid screen, leaving only the region around the opening to be defended.

A few simple experiments were performed at one colony to test this concept and to throw further light on the extent and nature of territorial defense. In the first experiment the partition between two adjacent nests, each containing half grown young, was broken so as to form a large hole or window through which the birds could freely pass back and forth (fig. 9A, B). The entrance hole of nest A, facing the observer, was then enlarged so as to permit a clear view of the interior of each nest. Within a few minutes after the observer had retired to the observation point, an adult returned to nest A and fed the young without showing detectable signs of alarm or disturbance. A minute later, and while the A bird was still in its nest, one of the owners of nest B returned with food, but on noticing the adult bird in nest A through the window, flew off uttering loud alarm calls. The second member of the A pair then arrived as its mate flew off. This bird hesitated briefly over its own nestlings, then reached through the opening into nest B and fed the vigorously gaping young in that nest. An owner of nest B again lit at the opening during this procedure but promptly flew off in alarm. Possibly because of these initial circumstances the B birds remained in an alarmed state during the ensuing 20 minutes while the A birds continued a nearly normal routine of feeding, delivering food to their own young five times and to those of their neighbors through the window four times. The first successful entrance of its nest by a B bird occurred 26 minutes after the A birds had started feeding. The second member of the pair followed shortly and after delivering its beakful of food to the young was suddenly confronted by an A bird through the window. A short scuffle ensued after which both birds left by the B entrance. But within a few seconds they and their mates had returned, and a round of fighting started which the observer was unable to follow in detail. One of the A birds which was marked was seen to enter its own nest repeatedly and leave or be thrown out of its own entrance and that of the B nest with equal frequency, but aside from this, individual identification of the contestants was followed with difficulty. Fighting con-

tinued without interruption during the ensuing ten minutes, then subsided with occasional flurries as the birds returned to feeding and nest repair activities. Behavior appeared to be quite normal except for brief but violent scuffles when a returning bird chanced to meet one of the neighbors in the combined nest interior. By the end of an hour enough observations had been made to formulate several generalizations which were substantiated by further observations the following day: (a) Fighting occurred only when a bird upon entering its nest encountered a neighbor in the combined nest interior. (b) Both members of each pair participated vigorously in the fighting. (c) Each bird was aggressive in both nests and attacked as frequently and as viciously in one as in the other. (d) Birds frequently left by the opening of the other nest but invariably entered through the opening of their own nest.

Nest repair was started during the first half hour, and by the next morning the entrance of nest A had been largely repaired and the window between the two nests had been nearly closed. A rebreaking at this time precipitated a performance similar to that of the preceding day and a second closing of the hole.

These few observations suggest that the birds of each pair initially accepted the entire combined interior of the two nests as their own possession, indiscriminately feeding the young of either nest and vigorously defending both cavities against intrusion. They also support the concept of a fixed defense zone or territory surrounding the natural nest opening, for while birds left the combined interior freely by either exit, they invariably entered by their own opening and defended only that opening.

As a further check on the significance of the natural opening, the partition between two other nests was perforated when one nest, C, was active and contained half-grown young, and the other, D, was abandoned and empty. As in the first experiment the birds in nest C accepted the disturbance and continued to feed their young, invariably entering through their own normal opening but leaving by either route. The following day, after it was clear that the birds were adjusted to the new situation, the normal opening of nest C was plugged with mud so that the only approach to the nestlings was by way of nest D. The confusion created by this act was great. During the first eight minutes 19 approaches were made to the nest. The birds simply hovered before the closed entrance for a few seconds, then flew on to return again after a brief circling flight. Once a bird lit at the site of the opening and pecked lightly at the plug, and once one flew on after hesitating at its own nest and entered another nest six feet away, apparently delivering its beakful of food there. In the ensuing two hours the owners of nest C continued to flutter up to their plugged nest openings but at less frequent intervals. Each visit was now brief, and the birds often moved on to other nest entrances as though seeking some suitable place to rest and deliver their loads of food. Neighboring nest owners vigorously repulsed these advances, however, sitting in the mouths of their nests and singing threateningly as the birds from C hovered near. Several times in these hovering flights a bird alighted on the rim of nest D as though by accident, and once one proceeded to enter and may possibly have delivered food through the window. But the new approach through nest D was never adopted, and the young in nest C died of starvation several days later before the experimenter realized that the closure of the natural opening had effectively excluded the parents from their brood.

There was no evidence of a defended flock territory around a breeding colony. Marked birds of other membership were repeatedly seen mingling with the local birds at colony entrances and without signs of antagonism. Furthermore, the birds which circled a colony giving alarm calls when the observer intruded were noted on several occasions to include marked individuals from neighboring colonies.

ANTISOCIAL AGGRESSIVE BEHAVIOR

Quite distinct from the defensive behavior of birds holding perches on the loafing wires or at the nest was an aggressive type of behavior indulged in by isolated individuals or by gangs of mixed colony composition. To all appearances many of the attacks of these raiders were deliberate and unprovoked and had no relation to nest or perch defense.

The status of these raiders and the situations which provoked their aggressive displays were not clear. Birds of both sexes were apparently involved, but young birds were never noted in raids at the nests. The similarity of the behavior of nest raiders to that of birds in the process of establishing a new colony site (unpublished observations) suggests that many may have been non-nesting birds prospecting for sites. The proportionately large representation of marked birds among them (usually 20-30 per cent) lends further support to this hypothesis, for the writer was guilty of causing a considerable number of desertions when he netted birds at their nests for marking. Specifically, two marked birds at the tower colony (C) were known to have taken up the raiding behavior immediately after they had been released from nesting duties by the destruction of their nests. Birds with nests were also known to participate in raids from time to time and it is likely that the composition of raiding parties was highly variable.

Raiders were strongly attracted to singing birds and to birds in distress following a nest disturbance. They were also much in evidence at the time the young were leaving the nests, concentrating at points where parent and fledgling activity was greatest.

Single raiders were noticed early in the season, but by mid-July they commonly joined forces into transitory groups of 3 or 4, and by mid-August into gangs of up to 10 or 15 with representatives from 2 or 3 of the local colonies. At this time they often moved from one site to another, spending from 10 to 20 minutes at each place before moving on. Although aggressive in their advances, these raiders generally if not invariably assumed a subordinate attitude in actual conflicts at nests. They would typically fly up to a nest entrance to hover briefly and circle off or to alight at the rim and lean far back so as to avoid the defense of the inmate. Usually the raider got no farther, but occasionally it gained entrance whereupon a fight ensued. On eviction the raider characteristically circled out and back. The nest defender might remain in the entrance or, if the raider was persistent, might make chase as the raider dodged and twisted and attempted to return. Often more than one nest was involved, and the nest owner found relief as its tormenter shifted to a neighbor's nest. At times, however, 3 or 4 raiders would work on a single nest at one time, giving the owner no rest for many minutes.

The motivation behind this raiding is not clear. Nests with defending owners were generally selected in preference to unattended nests, but numerous instances of successful entry suggest that the nest rather than the bird held the attraction. Unattended nests, and particularly empty nests, were commonly used as perches by the raiders, and when so occupied were defended as territorial possessions against all comers with vigorous singing and threat. In one case an old abandoned and empty nest was defended repeatedly although interruptedly by a single marked raider for two days on July 20 and 21, during which time it added nearly an inch of new mud to the rim. This was interpreted as an abortive attempt at territorial establishment which, although only irregularly contested by other raiders, failed to materialize. Perhaps it would have been successful had the season not been so far advanced.

Unattended nests containing eggs or small young held little attraction for raiders, but were briefly entered on occasion. Not uncommonly, however, the young or eggs of a nest were found on the ground below following a disturbance, and it is suspected

although not proven that raiders were responsible. Advanced young which had made their first flights and returned would, by food-begging actions, successfully protect their nests against raiders in the absence of their parents; in many instances a raider veered off or leaned back and left in response to the gapings of advanced nestlings. Interpretation of these gaping reactions as defensive is, however, unwarranted; they did not differ visibly from those directed to parents returning with food.

Aggressive attacks were not confined to the nest sites. Local spats involving from 2 to 10 birds occurred in loafing flocks on telephone wires every few minutes (fig. 4C). Some of these were merely adjustments of spacing, but others, especially late in the season, were caused by direct assaults. As at the nest, most of the attacks were perpetrated by a relatively few individuals, and, in certain instances at least, these were the same individuals that were currently raiding nests. In many of these encounters the attacker struck suddenly, either hitting the perching bird in passing flight or alighting briefly on its back. The victim, apparently surprised by the attack and generally knocked off balance, either flew off or quietly righted itself and continued its dozing or preening. In other cases, perhaps those in which the perching bird was alerted, the aggressor approached hesitatingly, hovering overhead or alighting on the wire a few inches away. This type of approach was generally greeted with threatening gapes and song which, with or without actual conflict, soon led to the displacement of one or the other contestant. Song given at such times often precipitated a local squabble involving from 5 to 10 birds clustering about and hovering over the singer (fig. 4C). Even in flight a singing bird was often approached or attacked by from one to 4 or 5 swallows.

DISCUSSION

The evolution of colonial nesting as a specialized form of social organization should properly be considered from the point of view of survival values which can be demonstrated in the colonial system. This has been ably done by Darling (1938) for various sea birds where he showed an increased stability, a mutual stimulation of reproductive activity, and an increased nesting success in large as compared with small colonies.

Also of importance in the evolution of colonial nesting are the spatial restrictions which narrowly specialized behavioral characteristics impose on a species. The specialization, whether inherent or traditional, which restricts nesting gulls and alcids to small islands so limits the number of usable breeding sites that procreation of the species depends on maximum utilization of the available space. A similar situation applies in the Cliff Swallow. The special environmental requirements for nesting in this bird include importantly a protected overhanging cliff, or cliff substitute, a source of mud of suitable quality for nest building, and an open foraging area. Sites containing all these essential features in close proximity were decidedly rare in North America before European settlement, and if each adequate site because of extensive territorial requirements could support only one pair of swallows, the dispersion would have been dangerously sparse for procreation and survival of the species. Any behavioral mutations which served to reduce the size of the defended territory around the nest and thus permit colonialism would, under such conditions, have survival value and be perpetuated.

The special behavioral and social patterns associated with colonial nesting conceivably have the same basic elements as the more familiar types of territorialism and dominance found in noncolonial species and probably evolved along with colonialism itself from a primitive noncolonial pattern. In all birds the beginning of the nesting season is marked by an increasing aggressiveness which, depending on the substrate of specific morphological and behavioral characteristics, leads to one or another of the many rec-

ognized types of territorial or hierarchical organization. Each species has its own pattern, relatively constant among its members, but clearly distinct from that of other species. The general pattern in the Cliff Swallow is similar in many respects to that of various colonial sea birds, suggesting a parallel evolution in diverse phylogenetic groups under similar restrictive pressures created by narrow specialization of nesting requirements.

Social coordination as seen in synchronized nesting and group foraging may likewise be interpreted as an evolutionary development or specialization in a colonial species of a basic behavioral characteristic. Such coordination has, to be sure, rarely been described for any but colonial species, but observations of this type are difficult to make, and the phenomenon may simply have been overlooked. Darling (1952) has recently summarized several studies which show or suggest that even in non-colonial species a powerful and important stimulus to reproductive processes is imparted by boundary contacts with the residents of neighboring territories. Coordinated behavior is apparently favored by the high frequency of boundary contacts which occur in colonial species.

The construction of an enclosed mud shell surrounding the nest proper is a behavioral specialization of considerable theoretical interest. This characteristic, as already suggested, appears to be related to the intense localized territorialism of the species, the shell screening the nesting bird from its numerous close neighbors and thus enhancing social stability in the group. In connection with this hypothesis it is interesting to examine the isolationist tendencies of other colonial birds. Colonial seabirds nesting in the open on a solid horizontal substrate characteristically space their nests so as to prevent neighbor interference and apparently never construct screening partitions. Where vegetational screening occurs, however, the nests may be more closely spaced and territorial fighting reduced (Austin, 1940:163). Colonial nesting on an elevated substrate imposes different problems of potential interference, and maximum utilization of space in a limited sphere is often associated with some form of screening. Species which utilize natural cavities on vertical substrates, such as those found on some sea cliffs, are naturally screened. Birds which excavate in dirt banks, as the Bank Swallow and the Bee-eater (*Merops*), are separated from each other by the walls of their burrows. The sociable Weaver Finch (*Philetaerus*), the Palm Chat (*Dulus dominicus*) and the Green Parakeet (*Myopsittacus monachus*) which, as a flock, construct massive nesting stacks with numerous cavities, are similarly screened individually from their neighbors.

The special construction of screening walls appears as a common characteristic of colonial birds which do not utilize or excavate nesting cavities. Among tree nesters many colonial weaver finches (Ploceidae), oropendolas and caciques (Cassicinae) typically construct globular or gourd-shaped nests with small and often downward projecting openings. The mud shell of the Cliff Swallow may perhaps be considered as an analogous case in a species using a vertical cliff rather than the branches of trees as the nesting substrate.

Although this trait of constructing enclosed nests is strongly developed in colonial species, it is by no means confined to them. Occurrences of it in non-colonial forms may have their explanations in completely unrelated factors. But since many are encountered among close relatives of the colonial swallows, orioles and weaver finches, it is possible that nest form may, at times, be a conservative inherited characteristic reflecting the habits of ancestral forms.

A comparison of the mud nests of cliff- and ledge-nesting swallows reveals a series ranging in complexity from a simple cup as found in the Barn Swallow to an elongate

retort with entrance tunnel such as that built by the Cliff Swallow. Homologous relationships seem to exist through the series: the mud frame or cup has merely been extended upward and outward until the retort form is achieved. Construction in the Barn Swallow and the Cliff Swallow proceeds in a closely similar manner up to the time of egg laying. At this point the Barn Swallow stops while the Cliff Swallow continues to complete its retort and to maintain it in repair. The special peculiarities of the Cliff Swallow's structure associated with the screening function are thus late developments in the nest ontogeny. One is tempted to interpret this in terms of Haeckel's law of recapitulation as evidence for a recent evolution of colonial nesting in the genus *Petrochelidon*.

SUMMARY

The social and territorial behavior of Cliff Swallows was studied at four colonies near Moran, Wyoming. Special attention was given to manifestations of positive and negative social responses and the balance of these in foraging, loafing and nesting activities. Adults and advanced nestlings were conspicuously marked with paints for individual identification.

Loafing aggregations on telephone wires and other suitable perches comprised members of all four colonies in close association. New arrivals at these roosts generally selected central perches at first, but later chose peripheral perches as crowding in the central portion became great. Limitations on crowding were imposed by individual intolerance of neighbors. A space of approximately four inches on all sides, about the reach of a perched bird, was defended against all comers. Encroachment on this defended space was resolved by threat displays and/or fighting.

Foraging aggregations comprised members of all four of the colonies. Usually nearly all foraging birds at a given time were grouped together into one unit which kept its unity by the consistent turning back of individuals as their independent forays brought them to the periphery of the aggregation. A foraging group, covering from 5 to 15 or 20 acres at a given moment, typically drifted as a unit, moving as much as two miles from the nesting sites. Arriving and departing birds from the nesting sites tended to confuse the picture of flock unity.

The gathering of mud for nest construction and repair was a social activity appearing and disappearing in irregular rhythm as the foraging aggregate shifted its scene of activity. The force of contagion originating in the foraging group occasionally induced individuals with completed nests to pack mud uselessly to other nests or to old broken nest shells.

Nesting aggregations or colonies showed no clear-cut independence or exclusiveness; flocks circling or resting close to a colony frequently contained marked birds from other colonies. Positive social responses were manifested by the close spacing of nests and the infrequency of isolated nests. Coordination of nesting activity was evidenced by a synchrony of reproductive cycles within groups as compared with other groups in the same colony or in other colonies. Interruptions of nesting activity by cold weather involved all members of colonies except those that had advanced to the incubation stage.

Displays of intolerance at the nesting colonies were similar to those observed at the loafing perches. Being fixed in location and semipermanent, the defended zone around a nest may be regarded as a true territory with a radial dimension determined by the reach of the occupant from the nest sill. Threat displays, song and territorial fighting were frequent and influenced the form of the nest and the eventual position of the opening. Experiments with interconnecting nests revealed that defense extends to the immediate surroundings of the entrance and to all that lies behind the entrance, and that,

while any convenient exit is used, only the proper opening of the nest is used as an entrance and center of defense.

Small groups composed at least in part of non-breeding individuals moved about from nest to nest and from colony to colony, molesting breeding birds at their nests and on the loafing perches.

The evolution of colonial nesting in the Cliff Swallow is thought to be related to the rather exacting requirements of the species for nesting sites and the scarcity of suitable situations before the construction of bridges and other artificial sites by white man.

Behavior patterns associated with colonial nesting differ from those of noncolonial nesters only in superficial features and may be considered as of the same phylogenetic origin. Similarities in behavior patterns of phylogenetically unrelated colonial birds are interpreted as instances of parallel evolution.

A positive correlation of screened nests with colonial nesting in birds is noted, and a hypothesis for the evolution of the mud retort from a simple mud nest of a noncolonial ancestral type is proposed.

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Department of Zoology, University of Wisconsin, Madison, Wisconsin, January 22, 1952.

NOTES ON PLUMAGES, MOLTS, AND AGE VARIATION OF THE RED CROSSBILL

By HARRISON B. TORDOFF

The extent of the invasion by Red Crossbills (*Loxia curvirostra*) of much of the United States in the winter of 1950-51 has been outlined in Audubon Field Notes (5, 1951:191-240). In northeastern Kansas the invasion was one of the largest on record. Crossbills were first noted on November 1 at Lawrence, Douglas County (Tordoff, Condor, 53, 1951:261). Flocks of up to 50 individuals became common by the end of November; they remained common until the middle of April, 1951. A few small flocks of five to ten birds still were in Lawrence at least as late as May 15.

I collected a total of 40 crossbills one mile east of Lawrence, on dates ranging from November 1 to April 15. Of these, 34 (25 males and 9 females) were preserved as study skins. Although this paper is not primarily of a taxonomic nature, certain nomenclatural matters are pertinent. The material studied included four subspecies as follows:

Loxia curvirostra sitkensis.—One male, wing 79.4 mm., depth of bill 8.7 mm., November 1 (Tordoff, *loc. cit.*); one female, wing 78, depth of bill 8.3, March 8. One other male, wing 84, depth of bill 8.8, taken on January 15, is intermediate between *sitkensis* and *L. c. bendirei*.

Loxia curvirostra bendirei and *L. c. benti*.—It is impossible to assign trinomials accurately to every specimen in a collection of vagrant crossbills which includes these intergrading subspecies. Griscom's monograph (Proc. Boston Soc. Nat. Hist., 41, 1937:77-210) of the Red Crossbill illustrates the difficulties involved in identifying vagrant specimens. Griscom (p. 129), in his original description of *benti*, gives a wing length of 93.0–98 mm. for males. On page 139, in a table of measurements of adult males, the range in wing length of specimens identified by him as *benti* is 91–100 mm. The latter range probably includes intergrades with other races. For *bendirei*, Griscom lists wing lengths of 86.5 to 94 mm. No other dimensions give any more clear-cut separation. Color is useful for most examples, but intergradation and individual variation in color rule out the feasibility of identifying all vagrant specimens to subspecies on this basis. Griscom, however, pointed out that his study, although based on large series, suffered from a lack of specimens known to be breeding birds.

In the present series, at least two males from Lawrence are characteristic of *bendirei* in both size and color. The majority of the series of 34 skins are clearly referable to *benti*, but several are more or less intermediate between the two subspecies just named. In the remarks below, except where otherwise noted, I refer to *benti*-like birds.

Loxia curvirostra stricklandi.—By Griscom's criteria, two males, taken on December 27 and January 15, approach this subspecies. Both are deep red in color and measure, respectively, wing 95 and 98, culmen 19.3 and 20.9, depth of bill 11.5 and 11.7. They might equally well be called *L. c. grinnelli*. *L. c. stricklandi* has been reported but once for Kansas; *grinnelli* has never been reported from the state.

COLOR OF FIRST-WINTER MALE PLUMAGE

The extensive literature on crossbills in eastern North America and the Old World indicates that ordinarily the first-winter males are less red than the older males. These first-winter males are described usually as resembling the females, but with green and red interspersed in the plumage. Mottled males and those of an orangish cast are frequently called immatures. I have no evidence as to the validity of this interpretation as applied to the plumages of male crossbills in eastern North America and the Old World. In birds of western North American races (at least in *benti*), however, as shown by the series at hand, the body plumage of immature males is not less red than in adult males.

In many of the specimens which I collected in November and December, 1950, the skull was incompletely ossified. By the middle of January, 1951, cranial ossification seemed to be complete in all specimens collected. McCabe and McCabe (Condor, 35, 1933:136) pointed out that the single-layered condition of the roof of the cranium, usually characteristic of immaturity in other passerines, is retained in many adult Red

Crossbills. They caution that "*thinness and transparency,* not singleness [of the roof of the braincase], are the criteria" that should be used to determine age in Red Crossbills. My determinations of age, as based on condition of the skull, are corroborated by characteristics of plumage also useful in age determination. These characteristics concern the color of the edgings of certain flight feathers not replaced in the postjuvenal molt. New World authors usually have neglected these plumage characteristics, even though Witherby, *et al.* (The handbook of British birds, 1, 1938:97) pointed out that first-winter males differ from adults in that the "*Wing-* and *tail-feathers* are fringed greenish instead of pinkish" in the young birds. Furthermore, the unworn primary coverts in young males are buffy-tipped. The present series shows that a few of the tail feathers frequently are replaced in the postjuvenal molt, but this does not affect the problem of age determination.

All the males which I judged to be young on the basis of both cranial ossification and edging of the flight feathers are fully as red as are birds judged to be adult on the same basis. The brightest bird of the entire series of 25 males is a first-winter bird. In the 40 other males of western races (mostly *benti*) in the University of Kansas Museum, there seems to be no significant difference in color of body plumage between first-winter males and adults. On the basis of the edging of the flight feathers, some mottled males are judged to be young birds and others adults.

It seems, therefore, that the first-winter male plumage of *L. c. benti,* and perhaps that of other western subspecies, differs markedly in color from the corresponding plumage of eastern North American and Old World subspecies. More conclusive proof would be furnished by specimens in postjuvenal molt in which all the incoming feathers were red. I have seen no specimens of *benti* in the postjuvenal molt.

AGE VARIATION IN SIZE

Griscom (*op. cit.*:138) stated that he used measurements of only "*fully adult* males . . . excluding all specimens in any way immature." Since Griscom may have been unaware that the western races (*benti,* at least) differ from the eastern races in first-winter plumage, he may have inadvertently included young birds in his measurements of "*fully adult* males" of the western subspecies. I decided to test the series of *benti* at hand to ascertain whether the young males differ significantly from the adults in wing length, tail length, length of culmen, and depth of bill at base. The series taken in 1950-51 contained nine adult males and 11 immature males. However, in the series from Lawrence identified by Griscom as *benti,* I found 11 adults to only six immatures. Furthermore, my series showed the adults to average larger than the young in all measurements, but in the series identified by Griscom, the adults average actually smaller than the immatures. Among the specimens from Lawrence identified by Griscom as *bendirei,* I found eight immature males to only three adults, and again the immatures average larger than the adults. I see no significant differences in color between the last two series. The conclusion that Griscom identified two age classes as two subspecies seems inescapable. His "*benti*" series seems to include adult males of *benti* (most likely, on the basis of color, from Colorado) and large immatures, possibly intergrades between *benti* and *stricklandi* (presumably from the southern Rocky Mountains). Griscom's series of "*bendirei*" seems to be made up of immatures of *benti* (probably from Colorado) and a few adult males of *bendirei.*

In order to eliminate as much sample bias as possible, all specimens of the present series, except those clearly referable to either *sitkensis* or *stricklandi,* were utilized in the statistical treatment of the material. Therefore, the measurements below pertain mainly to *benti,* but those of a few adults are more as in *bendirei.*

Wing length (chord), see also figure 1.—Immatures, mean (M) with standard error, 91.4±0.5; standard deviation (S.D.), 2.4; 25 individuals. Adults, M, 93.2±0.5; S.D., 2.5; 24 individuals.

Tail length.—Immatures, M, 53.6±0.4; S.D., 1.9; 25 individuals. Adults, M, 54.0±0.5; S.D., 2.5; 24 individuals.

Length of culmen.—Immatures, M, 18.3±0.2; S.D., 0.9; 25 individuals. Adults, M, 18.7±0.2; S.D., 0.8; 24 individuals.

Depth of bill.—Immatures, M, 10.3±0.1; S.D., 0.4; 23 individuals. Adults, M, 10.5±0.1; S.D., 0.4; 21 individuals.

The figures given here would be of no particular significance if they applied only to vagrant specimens. However, the rather considerable difference, especially in wing length and bill measurements, between adult males and first-winter males suggests that

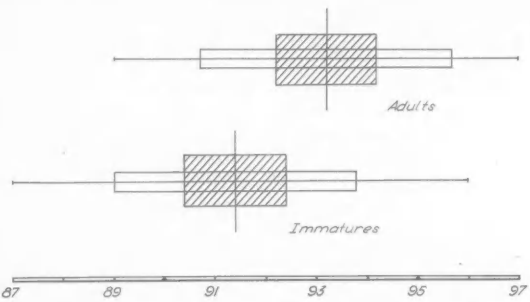

Fig. 1. Comparison of wing length of adult and first-winter Red Crossbills (*Loxia curvirostra benti*). Horizontal line represents observed range; vertical line marks mean; narrow rectangle, one standard deviation each side of mean; shaded rectangle, twice the standard error each side of mean. Scale in millimeters.

refinement of series into these age categories is highly desirable in future systematic work with Red Crossbills. If this refinement were applied to breeding birds, I am confident that subspecies separable mainly by small differences in size would be more easily and clearly defined.

PRENUPTIAL MOLT

In literature that I have examined there is no mention of any prenuptial molt in the Red Crossbill. Thirteen of my series of 34 crossbills were taken on or after February 25, 1951. All 13 show evidence of molt on the head, and especially on the chin and throat. The molt was more extensive in some birds than in others, but its extent points to a definite prenuptial molt, like that of some other members of the Carduelinae. The time of year in which crossbills undergo any given molt cannot be stated with certainty because of the erratic nature of their breeding cycle. Still, it seems inescapable that, because of its limited amount, the molt mentioned above is actually a prenuptial molt. I do not know whether this molt occurs in races other than *benti*.

It is remarkable that the new feathers attained by the prenuptial molt in the males of my series are all grayish- or yellowish-green. As a result, the males taken in March and April can be distinguished from those taken earlier by the interspersion of yellowish-green feathers on the crown and sides of the head and, especially, on the chin and throat of the former. In some males, the entire chin and throat, except in the midline, are grayish- or yellowish-green. Microscopic examination shows that the yellow feathers of the molting specimens are fresh and unworn in contrast to the considerably worn

red feathers on nearby areas of the head. Some other specimens in the University of Kansas collection, taken in Kansas in earlier years, show evidences of a prenuptial molt and replacement, in that molt, of red feathers by yellow feathers. However, most of the crossbills collected in former years were taken too early in the winter to show the molt.

One male taken on March 16, 1951, had suffered a seemingly accidental loss and subsequent replacement of all the feathers on the right side of the crown. At the base of the right side of the bill of this bird there is a large scar from an injury. The pertinent fact here is that all the new feathers on the crown are greenish and unworn in sharp contrast to those of the rest of the crown. As far as I can tell, all crossbills which have molted presumably while in Kansas have replaced the old feathers (red in males) with grayish- or yellowish-green feathers.

Red pigment in cardueline finches is seemingly unstable. The literature contains many records of failure of normally red male carduelines of various species to develop red pigment under abnormal circumstances such as captivity and introduction into different climates. Further, male carduelines, especially crossbills, are highly variable in color under normal conditions.

Most authors have ascribed the failure to develop red pigment in captivity to dietary deficiencies. In eastern Kansas, crossbills feed mainly on ornamental pines of species that are utilized for food by crossbills in areas where those pines occur naturally. *Pinus resinosa*, of the northeastern United States, and *Pinus nigra*, of central Europe, were the species most utilized for food by the crossbills which I collected. Perhaps in their native ranges the pines supply whatever is necessary for red pigment formation.

An alternative explanation may lie in the physiology of the crossbills themselves. Possibly the formation of red pigment depends in part on hormonal balance at the time of molt. The failure to develop red pigment at the time of the prenuptial molt is possibly due to hormonal imbalance. If male crossbills in prenuptial molt taken in many geographic areas all show developmental failure of red pigment, the latter possibility would seem the more likely.

SUMMARY

Red Crossbills taken in winter in northeastern Kansas in the 1950-51 invasion represent four subspecies, *Loxia curvirostra sitkensis*, *L. c. bendirei*, *L. c. benti*, and *L. c. stricklandi*. Of these, *L. c. benti* was most numerous.

First-winter birds can be distinguished from adults (up to an undetermined age) by the degree of ossification of the skull, although certain peculiarities of crossbills in this connection must be recognized.

The color of the edging of certain flight feathers not replaced in the postjuvenal molt also serves to separate young males from adults.

First-winter male plumage in *L. c. benti* (and perhaps other western subspecies) differs from the corresponding plumage of eastern North American and Old World subspecies in that in *L. c. benti* the color of the first-winter body plumage is fully as red as in the adult males.

Age variation in size in Red Crossbills is of sufficient magnitude to make necessary the determination of age of specimens in samples used for taxonomic purposes.

L. c. benti, and possibly other subspecies, has a distinct, although limited, prenuptial molt involving the chin, throat, and, to a lesser degree, the rest of the head.

In northeastern Kansas, the feathers attained in the prenuptial molt lack red pigment in the males. Two possible explanations of this developmental failure of red pigment are mentioned.

University of Kansas Museum of Natural History, Lawrence, Kansas, February 12, 1952.

FROM FIELD AND STUDY

Another Unrecorded Specimen of Neochloe brevipennis.—When describing the vireo *Neochloe brevipennis browni* from near Chilpancingo, Guerrero, México, Miller and Ray (Condor, 46, 1944:41-45) listed all six recorded specimens then known of the nominate race. Stresemann (Condor, 49, 1947:210) brought to light a seventh, "collected at the Hacienda de Fuxpango, Orizaba, Vera Cruz, Mexico. Neither date nor collector is indicated on the label, which bears a mysterious original number (No. 275). Possibly the bird is one of Matteo Botteri's specimens . . . ."

Dr. Stresemann's supposition is almost certainly correct, inasmuch as Botteri's Orizaba specimen in the United States National Museum bears collector's number 271 (see Baird, Rev. Am. Birds, 1866:372). Moreover, so far as I know, Botteri and Sumichrast were the only men who ever collected birds at Fuxpango, spelled Tuxpango by Sumichrast, who writes (Mem. Bost. Soc. Nat. Hist., 1, 1869:547): "This exceedingly rare bird has only been found, so far as I am aware, at Orizaba, by M. Botteri. In the course of many years he was able to procure but a very few specimens."

An eighth specimen of *brevipennis*, and apparently the first since Chapman's three at Jalapa in 1897, was collected by me in dense scrubby second growth a mile south of Jalapa, Veracruz, at about 4500 feet on May 4, 1939. It is a breeding male in somewhat worn plumage, with wing 59.5 mm., tail 57, culmen about 10, iris white, and legs and feet slate-black. It is now in the Museum of Comparative Zoology. The bird was retrieved about twenty-five feet up in a tangled mass of vines and had been eating insects and the seeds of an unidentified berry.

On April 20, 1939, I had closely watched a singing *Neochloe* working slowly through low but rather thick bushes at the edge of a stream between semi-wooded knolls perhaps two miles from where the specimen of May 4 was shot. During about five hours spent at these two stations near Jalapa, the vireos were in sight only a very few minutes, although hundreds of times I heard the song, which is similar to that of the White-eyed Vireo (*Vireo griseus*), though shorter and with less volume and emphasis. My field notes state that it consists of from three to five notes, least often five, most often three, with the stress falling on the third, except when five are given, in which case the fourth is loudest. A very common bird around Jalapa having a somewhat similar song is *Catharus aurantiirostris*, but the thrush's song is longer, more varied, higher pitched and more tinkling than than of the vireo.—Frederick W. Loetscher, Jr., *Department of Biology, Centre College, Danville, Kentucky, November 22, 1951.*

Recent Bird Records from Southern Nevada.—Several recent observations have been made in southern Nevada which add to the distributional information recently published by Linsdale (Condor, 53, 1951:228-249).

Aix sponsa. Wood Duck. On October 26, 1951, an immature female was found crushed on U. S. Highway 91–93 near Dry Lake, 25 miles northeast of Las Vegas, Clark County, Nevada. One wing was all that could be saved from this specimen, a new record for southern Nevada.

Aythya marila. Greater Scaup Duck. An immature male was examined in the bag of a hunter shooting on the Virgin River near Riverside, about ten miles southwest of Bunkerville, Clark County, Nevada, on November 4, 1951.

Eupoda montana. Mountain Plover. On November 1, 1951, a single bird was flushed from the creosote bush—Mohave yucca vegetation at the 3100 foot level on the west slope of the Charleston Mountains, 12 miles southeast of Pahrump, Nye County, Nevada. This seems to be a first record for southern Nevada. There is an earlier record by Monson (Condor, 51, 1949:263) from the Needles area, California.—Gordon W. Gullion, *Nevada Fish and Game Commission, Boulder City, Nevada, December 23, 1951.*

Carolina Wren and Catbird in Southern New Mexico.—The appearance of a bird far out of its usual range must be recorded only with caution and upon positive identification. With regard for both of these injunctions I submit observations on two wanderers: Carolina Wren (*Thryothorus ludovicianus*) and Catbird (*Dumetella carolinensis*).

A Carolina Wren appeared on May 8, 1951, in the vicinity of my home at Roswell, New Mexico. Its call, an arresting and clear *wheedle, wheedle, wheedle,* announced a stranger in the neighborhood. It went from leafy elm to leafy elm, repeating the call. When it stopped on a wire in an alley, I was

in excellent position with binoculars. Except for a dubious early record (Bailey, Birds of New Mexico, 1928, p. 538), the species apparently has not been found in New Mexico heretofore.

A Catbird appeared in Roswell on June 6, 1951. I saw it well at a distance of twelve feet. I believe this is the first time a Catbird has been recorded in southern New Mexico (see Bailey, *op. cit.*, p. 554).—VESTER MONTGOMERY, *Roswell, New Mexico, February 1, 1952.*

The Validity of the Fossil Crane Grus nannodes.—Recently, while making a comparative osteological study of the crane genera *Grus, Balearica,* and *Anthropoides,* some attention was directed toward fossil representatives. Wetmore and Martin (Condor, 32, 1930:62-63) described a fragmentary carpometacarpus from the Pliocene deposits of Sherman County, Kansas, as *Grus nannodes.* The setting up of a new species for this bone, to distinguish the bird from the Recent species *G. canadensis,* as now construed, was entirely on the basis of size; the fossil appeared to be very small. No differences in conformation were noted by the authors; indeed, in the absence of the entire proximal end, the bone would seem to have little "character" remaining.

I examined the type specimen (Univ. Kansas Mus. Vert. Paleo. No. 3757) and compared it with a series of 17 carpometacarpi of Recent Little Brown Cranes, *Grus canadensis canadensis.* Confirming the statement of Wetmore and Martin (*loc. cit.*), I found no qualitative features of diagnostic value. The larger series of Recent material now at hand permits more detailed statistical treatment, as given in table 1. Small differences in certain measurements of the fossil, between those in the table and in the original description, are seemingly the result of slight variations in the method of measuring.

The handling of single specimens in a statistical analysis poses certain problems; the standard deviation is not known and the usual procedure is impossible. One may, however, assume that the coefficient of variation of the same linear measurement made in the same way on two related species will be nearly the same, if each sample is homogeneous. In the present instance, the coefficient of variation for a measurement in *G. c. canadensis* may be used for the same measurement in *G. nannodes,* and thus the probable standard deviation may be obtained from the known relationship existing between coefficients of variation and standard deviations. These interpolated data are included in table 1.

Table 1

Measurements of *Grus nannodes* and *Grus canadensis canadensis* (in millimeters)

	Length from proximal end intermetacarpal space to distal end of bone		Width just proximal to intermetacarpal space	Greatest distal width	Depth, middle of metacarpal two	Width, middle of metacarpal two
	anconal side	palmar side				
G. nannodes (type)	60.8	56.2	7.0	11.1	5.7	4.8
Theoretical range						
(M± 2 σ)	52.6–69.0	49.0–63.4	6.2–7.8	10.0–12.2	5.2–6.2	4.3–5.3
(M± 3 σ)	48.6–73.0	45.4–67.0	5.9–8.1	9.5–12.7	5.0–6.4	4.0–5.6
Assumed standard deviation	4.08	3.61	0.38	0.53	0.24	0.25
G. c. canadensis (17 specimens)						
Mean	72.4	67.9	8.2	13.7	6.5	5.6
Observed range	65.0–81.3	60.5–74.8	7.6–9.1	12.5–14.2	6.0–6.8	5.0–6.1
Calculated range						
(M± 2 σ)	62.5–82.3	59.2–76.6	7.3–9.1	12.4–15.0	6.0–7.0	5.0–6.2
(M± 3 σ)	57.8–87.0	54.8–81.0	6.9–9.5	11.8–15.6	5.7–7.3	4.7–6.5
Standard deviation	4.86	4.36	0.44	0.65	0.27	0.29
Coefficient of variation	6.71	6.42	5.36	4.74	4.15	5.17

On the basis of normal distribution, 99 per cent of all individuals may be expected to be included in a range indicated by the mean, plus or minus three standard deviations, and 95 per cent in plus or minus two standard deviations. Thus, the theoretical range of each set of measurements of *G. nannodes* may be set up. To indicate the greatest possible range, the mean should be set up: (1) as three standard deviations below the single measurement; or (2) three standard deviations above the measurement; or (3) as the single known measurement. This method sets up three possible curves to represent the fossil population, and each curve is based on the single measurement used in different positions.

If we assume the actual mean of each dimension of the fossil population lies at a position three standard deviations above the recorded measurement, the upper limits of the ranges of all dimensions of the fossil fall within the 99 per cent limits of *canadensis*. Use of each single measurement in *nannodes* as a simple mean indicates that in all dimensions, except distal width, the fossil falls within the expected range of 99 per cent of the *canadensis* specimens. If the mean for each measurement of the fossil is assumed to lie three standard deviations below the recorded measurement, all mean dimensions of *nannodes* are outside the 99 per cent limits of *canadensis*.

If the ranges are calculated on a 95 per cent limit ($M \pm 2\sigma$, table 1) all dimensions of *nannodes* fall outside the 95 per cent limits of *canadensis*. Thus the probability that measurements of *nannodes* are part of the variability of *canadensis* is less than five per cent. All indications are that the measurements of *nannodes* reflect means which are different from those of *canadensis*.

Therefore, it is likely that *Grus nannodes* is actually a different and smaller crane. This is of interest, for in many instances of close relationship between fossil and Recent species of birds of the same genus the fossil form is larger.—HARVEY I. FISHER, *Department of Zoology, University of Illinois, Urbana, Illinois, January 4, 1952.*

Status of the California Gull Colony at Mono Lake, California.—Mono Lake, which lies just east of the Sierra Nevada in California, has for many years been the site of a large colony of the California Gull (*Larus californicus*). Dawson[1] (Birds Calif., 1924:1398ff), who visited the lake in 1919, describes colonies on two islands in the lake, the north and south islands, but the latter has since been abandoned. In 1950 and 1951 I visited the colony on the north island to obtain some birds for life history studies of their parasites. The present colony occupies a restricted area, possibly 600 by 80 meters in extent, on the southeast side of the island. While I had not time for a careful census, I estimated the number of birds in the colony at about 1500. In an area of about 2000 square meters in the most populous part of the colony I counted some 40 nests. Dawson estimated the number of nests in the south colony only at 850, while Grinnell and Storer (Animal Life in the Yosemite, 1924:248) believed the total number of birds in this colony to be close to 1000 pairs. Nichols (Condor, 40, 1938:262) estimated the number of birds in the north colony at 3000, so it is evident that their number is decreasing. Why this is so is uncertain, as the gulls have no apparent enemies, with the possible exception of an occasional predatory bird, and there is nothing to disturb them on the nesting grounds at Mono Lake.

The food of the young birds is mainly the larvae and pupae of the brine fly (*Ephydra*), but some fish remains were found, and judging from the numerous tapeworms present, the brine shrimp (*Artemia*), which occurs in countless numbers in the lake, forms an added article of diet.

Grinnell and Storer (p. 250) state that the diet of the young gulls "consists exclusively of brine shrimp. Birds 3 or 4 days old had . . . a considerable number of these crustaceans in their stomachs" which they disgorge while the adults pour down similar disgorgements. I have had a similar unpleasant experience with the young but not with the old birds. In my own experience, however, these disgorgements apparently consisted entirely of fly pupae. Why there should have been a change in the food habits of these birds since Grinnell and Storer observed them is difficult to explain.

Behle (Condor, 37, 1935:24-35), writing of the bird colonies of Great Salt Lake, says (p. 28) "I have frequently seen flocks of gulls floating on the surface of the water feeding on brine shrimps." He mentions no stomach examinations to support his statement, and it is possible that the gulls were eating fly pupae, rather than shrimps, for I have similarly observed gulls on Mono Lake feeding, as I supposed, on shrimps only to find upon dissecting two of them that their stomachs were full of fly pupae.

The fish which the young birds had eaten must have been brought into the colony by the parent

birds, probably from a garbage dump on the lake shore, or possibly from nearby lakes in the mountains, as no fish live in the highly saline waters of the lake. In the laboratory the gulls evince little fondness for fly pupae after having been fed on fish and horse meat.

Both young and old gulls are extensively parasitized by a tapewarm (*Hymenolepis californicus*) which I have recently described (Jour. Paras., 36, 1950:9-12) and which is obtained from the brine shrimp as proven by feeding the latter to newly hatched birds. Every gull that was a few days old which I examined contained these worms. Even before leaving the nest the birds are occasionally infested.

In the laboratory the young gulls eagerly accept water, drinking and splashing in a basin which is quickly fouled by their excreta. Do the young gulls drink Mono Lake water? In the laboratory they refuse it, although they drink fresh water readily and sea water reluctantly. There is no fresh water available on their breeding grounds, so it is possible that they will drink lake water before they have become accustomed to fresh water. It is also possible that they obtain sufficient water from their food without drinking any.

This study was made in the course of parasitological research at the laboratory of the San Diego Zoological Society, to whom I am indebted for many courtesies.—R. T. YOUNG, *San Diego, California, January 2, 1952.*

Egg Laid by Killdeer Frightened from Nest.—The Killdeer (*Charadrius vociferus*) is an abundant breeding bird along the streams of the eastern slope of Mount Hamilton, Santa Clara County, California. On April 23, 1950, a pair of Killdeers on Arroyo Bayo, seven miles east of Mount Hamilton, gave alarm calls and ran slowly ahead as I approached. I watched the nearer bird with a 9×35 binocular from a distance of approximately 50 feet as it moved slowly away and stopped. The anal region was noticeably distended and the circumanal feathers were spread. As I watched, an egg emerged from the bird's cloaca and dropped to the ground. The bird paused for a few seconds, then ran on without even looking at the egg. I watched the bird for a minute longer, then picked up the egg which was still wet. The egg was dropped at 9:25 a.m. Apparently the female Killdeer had been sitting on the nest site and was nearly ready to lay when I frightened her. A careful search for the nest site was made but it was not located.—CHARLES G. SIBLEY, *San Jose State College, San Jose, California, January 15, 1952.*

Notes on the Sexual Behavior of Two Falcons.—On March 12, 1949, at the west end of the University of California campus, Berkeley, California, at approximately 11 a.m., five Sparrow Hawks (*Falco sparverius*) were seen in the air around the American Trust Building, the tallest building in the city of Berkeley. A quarter of a mile away two other Sparrow Hawks were active. The first group milled about and occasionally members of it landed on a sign on top of the building. Copulation was seen to take place suddenly between two members of the first group. A third bird flew in, causing the male to depart, and then copulated with the same female. This activity was repeated twice so that there was no doubt that two males were attending one female. Observation of this group was not continued.

At the same time the other pair of birds was active in sexual display. The male performed a vigorous diving flight, calling loudly almost continuously. Shortly afterwards this pair was seen copulating on top of a high flag pole. The nest of the pair was found nearby in a broken cornice of a three-story apartment house. Many times during the following week these birds were seen in copulation on various high structures in the vicinity of the nest. Throughout the next few weeks the female was seen in the nest hole. Once when the nest was approached, the female flew out calling and landed on a telephone wire across the street. The male responded by flying to her, and copulation took place. Shortly after sunrise at 6:10 on March 20 this pair was seen in copulation. In view of this activity it was surprising that eggs were not found in the nest until six weeks after the first copulation was recorded.

Although the incubation period and fledging time were not determined, the young were observed to be dependent on the adults and remained in the adults' territory until early September. After fledging the young moved to a tall eucalyptus tree on the University grounds where they could be heard calling almost continuously from dawn to dusk.

In the spring of 1948 the senior author was a member of a field party in the Mexican highlands. On February 23, 1948, near El Mante, San Luis Potosí, two Bat Falcons (*Falco albigularis*) were

discovered. One bird was circling the rim of a broad canyon calling loudly. After two trips around the rim it flew directly to a dead tree and copulated with a second bird which to this moment had been silent and consequently overlooked. During the copulatory act the female also called loudly. The male then commenced circling and calling again.—HENRY E. CHILDS, JR., *and* ARCHIE S. MOSSMAN, *Museum of Vertebrate Zoology, Berkeley, California, February 20, 1952.*

Scrub Jay in Bexar County, Texas.—On April 12, 1951, I took a Scrub Jay (*Aphelocoma coerulescens*) from a small flock on a juniper-covered hillside about one mile southwest of Leon Springs in northwestern Bexar County, Texas. The specimen, a first-year female (ovary 10 × 5 mm., largest ovum 1 mm.), is now no. 123268 in the Museum of Vertebrate Zoology. Two other individuals were seen at the same time and a fourth was heard calling. In this area, at an elevation of approximately 1200 feet, the junipers were closely spaced, with a few live oaks (*Quercus virginiana*) and Texas oaks (*Q. texana*) scattered through them. This woodland, typical of the Edwards Plateau and the characteristic habitat of this jay (Pitelka, Univ. Calif. Publ. Zool., 50, 1951:300), extends for several miles to the southeastward, being replaced gradually by mesquite and low shrub growth as one approaches San Antonio.

The easternmost locality for *A. c. texana* cited by Pitelka (*op. cit.*:403) is Kerrville, Kerr County. Leon Springs lies about 40 miles southeast of that point. Beckham (Proc. U. S. Nat. Mus., 10, 1888: 633-696) does not list this supposedly resident jay from the San Antonio region, although he spent more than a week collecting birds at Leon Springs in March, 1887. Attwater (Auk, 9, 1892:337-345) does not report this species from the vicinity of San Antonio, nor do Kirn and Quillen in their list of the "Birds of Bexar County, Texas" (Witte Memorial Museum, San Antonio, 1927). Scrub Jays were not noted in the vicinity of Boerne, Kendall County (about 12 miles northwest of Leon Springs) in the course of two winter's residence there by Brown (Auk, 1, 1884:120-124).

Whether this occurrence represents an instance of wandering of non-breeding individuals or an extension of breeding range in recent years must be determind by future study.—KEITH L. DIXON, *Museum of Vertebrate Zoology, Berkeley, California, December 20, 1951.*

Homing Instinct in Cowbird.—On May 9, 1950, at Benicia, Solano County, California, I banded two male Cowbirds (*Molothrus ater*), and two days later, on May 11, a female of the same species. These three birds remained through June and departed early in July. They occupied a territory equal to some six square blocks, in which area my home is located.

From the middle of April to the middle of July, 1951, these same three cowbirds again frequented my banding traps, repeating so frequently that they became a nuisance. The bait used was ordinary canary bird seed which I was using to catch linnets and other seed-eating birds.

The female appeared to be mated with the two males, as the three were seldom far separated, and no other cowbirds were in evidence except three one-time visitors to my traps.

As an experiment, I took one of the two male cowbirds with me in my car from Benicia to Sacramento, sixty miles distant, on May 20, 1951. After exhibiting him at a meeting of the Western Bird-banding Association, I released him. Two days later this same bird was repeating again in my traps in Benicia, direct evidence of attraction either to its customary haunts or to its mate, or to both. —EMERSON A. STONER, *Benicia, California, February 29, 1952.*

Roseate Spoonbill in Imperial County, California.—On September 30, 1951, at 8:30 a.m., E. W. Elder and myself were observing waterfowl on the Alamo River where it empties into the Salton Sea in Imperial County, California. A group of five pinkish-colored birds flew to and landed in a small bay about 200 yards from us and began feeding in the shallow water. Closer inspection provided definite identification as Roseate Spoonbills (*Ajaia ajaia*). Through the field glasses we were able to observe their large spoon-like bill and the characteristic sidewise motion of it while feeding. The birds had a faint pinkish appearance while on the ground but when in flight the underparts were very prominently pinkish. They fed for 20 minutes and when startled took flight and alighted among a number of other birds at the edge of the Salton Sea. Records of Roseate Spoonbills are rare for California but there are reports for Imperial County in 1909, 1913 and 1927.—WILLIAM A. WOOTEN, *United States Fish and Wildlife Service, Los Angeles, March 12, 1952.*

NOTES AND NEWS

The painting of the Massena or Mearns Quail (*Cyrtonyx montezumae*) reproduced as the frontispiece of this issue is the eighteenth in the series of paintings by Andrew Jackson Grayson to appear in The Condor. This color plate was given by Louis Cass, Sr., to whom all readers of the journal are indebted. Grayson painted this spectacular quail from specimens taken at Guadalajara, Mexico, in May of 1866.

We learn as we go to press of the death of Joseph S. Dixon in Escondido, California, on June 23, 1952.

A recent paper by George H. Lowery, Jr. (A Quantitative Study of the Nocturnal Migration of Birds, University of Kansas Publications, Museum of Natural History, vol. 3, no. 2, pp. 361-472, 1951) describes the success attained by a new method of studying the movement of birds at night, using a telescope to count the silhouettes passing before the disc of the moon. In the spring of 1948, over 200 ornithologists, students, and astronomers put this method to work at 30 widely separated stations on the North American continent. No particular effort was made at that time to enlist the aid of observers in the West. As a result, all the country west of the Great Plains was represented by ony a single station in California.

Improved mathematical techniques now permit the processing of data in unlimited quantities. Accordingly, a second cooperative project is being scheduled for the fall of 1952—a project that is expected to be truly nationwide. The observational procedure is a simple one. Anyone with access to a telescope has an opportunity to contribute tremendously to the solution of the many puzzling problems connected with the movement of birds at night. Details regarding both the method and other aspects of the problem may be secured by writing at once to Robert J. Newman at the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana.

Richard F. Johnston has been appointed as one of the Assistant Editors of The Condor as of June of this year.

COOPER CLUB MEETINGS

ANNUAL MEETING

Scientific Sessions

At the Twenty-third Annual Meeting of the Cooper Ornithological Club held at the California Academy of Sciences, San Francisco, May 9 and 10, 1952, the following papers were presented on the scientific program: A Method for the Objective Study of Bird Song, William R. Fish; The Refractory Period for Photostimulation in *Zonotrichia*, Alden H. Miller; Preliminary Observations on the Differentiation and Growth of Down Feather Papillae, Robert E. Bailey; The San Francisco Bay Region Nesting Survey, Charles G. Sibley; Plant Succession and Quail Reproduction, Ian I. McMillan; The Daily Activity Cycle in Arctic Birds, Frank A. Pitelka; Preliminary Report on Color Variation and Environment in the Wren-tit, Darl E. Bowers; February on Barro Colorado in the Panama Canal Zone, Junea W. Kelly; Birds of the Tzitzio Region, Michoacán, Mexico, John Davis; Intestinal Morphology of Gallinaceous Birds in Relation to Food Habits, A. Starker Leopold; The Problem of Adaptation in the Galapagos Finches (Geospizinae), Robert I. Bowman; An Incredible Bird from a Cave Deposit in Nevada, Hildegarde Howard; Discovery of an Early Publication on the California Condor, Lois Chambers Taylor; Comparative Ecology and Behavior of Hybridizing Titmice in Texas, Keith L. Dixon; Breeding Bird Populations in Relation to Plant Succession, David W. Johnston; Species Characters and Hybridization in Certain *Empidonax* Flycatchers, Allan R. Phillips; Ecologic Comparisons of Avifaunas, George W. Salt; The Changing Habitat of the Western Robin in Southern California, Kenneth E. Stager; Junior Nature Museums, an Answer to the Conservation Problem; John Ripley Forbes; The Status of Certain Species in the San Francisco Bay Region, Charles G. Sibley; Variation in the Booming Nighthawks of Western North America, Robert K. Selander; An Analysis and Survey of Contemporary Bird Painting, Gene M. Christman; The Problem of Molt of the Tarsal Scutes in Birds, Robert W. Storer.

NORTHERN DIVISION

FEBRUARY. — The monthly meeting of the Cooper Ornithological Club, Northern Division, was held on Thursday, February 7, 1952, at the University of California, Berkeley. The following names were proposed for membership: John B. Bushman, Salt Lake City, Utah, by Wm. H. Behle; Vaughan MacCaughey, 726 Cragmont Ave., Berkeley, Calif., by Junea W. Kelly; Sylvia L. Thomssen, 56 Avon Road, Berkeley, Calif., by Alden H. Miller; Willis V. Woodbury, Reno, Nev., by Ned Johnson; Paul J. Keating, Tacoma, Wash., by Gordon D. Alcorn; John D. McCarty, Jr., 1020-East 21st Street, Oakland, Calif., by Frank A. Pitelka; and Robert V. Golden, Route 2, Box 709, Los Altos, Calif., by Charles G. Sibley.

Mr. Howard L. Cogswell and Dr. Charles G. Sibley reported their observations of Townsend Solitaires in California this winter.

The speaker of the evening was Mr. E. W. Pfeiffer of the Museum of Vertebrate Zoology, who presented a motion picture and commentary entitled, "Glimpses of Various Birds of Prey from North America and Africa."—ROBERT I. BOWMAN, *Secretary*.

MARCH.—The monthly meeting of the Northern Division of the Cooper Ornithological Club was held on March 6, 1952, at the University of California. The following names were proposed for membership: Mr. Wm. Doggett, 2125 Union St., Eureka, Calif., by Robert I. Bowman; Mrs. Lester H. Brubacker, 181 Mountain View Ave., San Jose, Calif., by Charles G. Sibley. Mr. D. W. Johnston reported Allen Hummingbirds seen in Marin County on February 4 by Mr. Robert A. Norris. Allen Hummingbirds were reported in Richmond during the first week of February.

The speaker of the evening was Dr. Seth B. Benson, who presented an illustrated account of "Distributional Areas for Vertebrate Animals in Baja California."—ROBERT I. BOWMAN, *Secretary*.

APRIL.—The monthly meeting of the Northern Division of the Cooper Ornithological Club was held on April 3, 1952, at the University of California. The following names were proposed for membership: Mr. David L. Samuels, Atherton, Calif., by Charles G. Sibley; Mr. Albert Schnitzer, 922 Lakeside Place, Elizabeth 3, N. J., by Junea W. Kelly.

Recent publications reviewed or noticed were: Proceedings of the Xth Ornithological Congress of Uppsala, Sweden; A. A. Allen's "Hunting Birds with Camera; and Charles G. Sibley's "The Birds of the South San Francisco Bay Region."

The speaker of the evening was Dr. Frank A. Pitelka, who gave an illustrated lecture entitled "A Summer Season in Northern Alaska Bird-life." —ROBERT I. BOWMAN, *Secretary*.

SOUTHERN DIVISION

MARCH.—The monthly meeting of the Southern Division of the Cooper Ornithological Club was held March 25, 1952, at the University of Southern California. The following names were proposed for membership: LeRoy William Giles, 280 E. Front St., Fallon, Nev., and Florence Nora Poyser, Box 1, Boulder City, Nev., both by G. W. Gullion; Mrs. Carlos E. Gibson, 9980 Beachy Ave., Pacoima, Calif., by K. E. Stager; Frank A. Stoerman, 1721½ Westport Ave., Kansas City 2, Mo., by Harold C. Hedges; Paul Schwartz, % York Venezuela, C. A., Apartado 1766, Caracas, Venezuela, and H. R. Vance, Terrace, British Columbia, Canada, both by T. R. Howell; Charles Tuttle Drummond, Box 93, Rt. 1, Montague, Calif., Walter K. Dunlap, 103 Ardmore Rd., Berkeley 7, Calif., Mrs. Paul H. Fairbanks, U. S. Forest Service, Miramonte, Calif., George Elford Hudson, 303 Side St., Pullman, Wash., Howard Knight, Weber College, Ogden, Utah, Ralph J. A. Stern, 305 Clay St., San Francisco 11, Calif., and Arthur C. Twomey, Carnegie Museum, Pittsburgh, Penn., all by C. V. Duff.

H. L. Cogswell, speaker of the evening, discussed "Physical Features of the Territories of Birds of Chaparral and Coastal Sagebrush."—DOROTHY E. GRONER, *Secretary*.

APRIL.—The monthly meeting of the Southern Division of the Cooper Ornithological Club was held on April 29, 1952, at the University of Southern California. The following names were proposed for membership: Mrs. C. R. B. Combellack, 3021 Friendly St., Eugene, Ore., by Gordon W. Gullion; Harry J. Reidsma, 100 N. Mansfield Ave., Los Angeles 36, Calif., by W. J. Sheffler; Earl Axel Anderson, 7335 N. Odell Ave., Chicago 31, Ill., Lyde William Bro, 236 Palisades Ave., Santa Monica, Calif., and Homer V. Griffin, Paonia, Colo., by C. V. Duff.

Dr. Barbara Blanchard Oakeson spoke on "The Natural History of Mountain Village, Alaska," illustrating with Kodachrome slides.—DOROTHY E. GRONER, *Secretary*.

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Year following address indicates date of election to membership. Year in parentheses indicates date of advancement to Honorary or Life Membership. [L.]=Life Member.

A

Abbott, Cyril E., Agersborg Biological Laboratory, Centralia, Ill. 1947.

Abdulali, Humayun, 75 Abdul Rehman St., Bombay 3, India. 1947.

Adams, Claude T., Dept. Biology, Univ. Florida, Gainesville, Fla. 1951.

Adams, Herbert G., 730 S.W. St. Claire Ave., Portland 5, Ore. 1947.

Adams, I. C., Jr., Box 158, Columbia, Mo. 1942.

Adams, William H., R.F.D. 2, Box 246, Selma, Ala. 1952.

Adams, Velma, 714 S. Oxford Ave., Los Angeles 5, Calif. 1949.

Adelson, Richard H., 34 Wensley Dr., Great Neck, N.Y. 1950.

Ainsworth, Cynthia, 1840 S. 8th Ave., Monrovia, Calif. 1949.

Albright, Ray, Rt. 1, Dayton, Ore. 1950.

Albro, Mary S., 51 Canyon Rd., Berkeley 4, Calif. 1928.

Alcorn, Gordon D., College of Puget Sound, Tacoma 6, Wash. 1942.

Alcorn, Joseph R., Rt. 1, Box 19-A, Fallon, Nev. 1939 (1947) [L.].

Aldrich, Elmer C., 5631 Camelia Ave., Sacramento 19, Calif. 1935.

Aldrich, John W., 21 W. Spring St., Alexandria, Va. 1942.

Alexander, Gordon, Dept. Biology, Univ. Colorado, Boulder, Colo. 1919-1921, 1941.

Allen, Arthur A., Cornell University, Ithaca, N.Y. 1911.

Allen, Charles H., Griffith Park Zoo, P.O. Box 284, Los Angeles 27, Calif. 1951.

Allen, Esther C., Camarillo State Hospital, Camarillo, Calif. 1951.

Allen, H. A., 607 S. Hill St., Los Angeles 14, Calif. 1949.

Allen, Mrs. Lois H., 37 Mosswood Rd., Berkeley 4, Calif. 1945.

Allen, Walter I., 1830 Pepper Dr., Altadena, Calif. 1922.
Allis, Frederick A., 122 W. Fir St., Oxnard, Calif. 1950.
Alperin, Irwin, 2845 Ocean Ave., Brooklyn 35, N.Y. 1947.
Amadon, Dean, American Museum of Natural History, Central Park at 79th St., New York 24, N.Y. 1943.
Anderson, A. H., 3221 Kleindale Rd., Tucson, Ariz. 1932.
Anderson, Charles H., 1015 Connely Dr., Salinas, Calif. 1947.
Anderson, Earl A., 7335 N. Odell Ave., Chicago 13, Ill. 1952.
Anderson, Frank G., Dept. Sociology, Univ. Maryland, College Park, Md. 1951.
Anderson, Rudolph M., 58 Driveway, Ottawa, Ontario, Canada. 1916.
Anderson, William, Box 187, Calipatria, Calif. 1948.
Andrews, Arthur A., 75 Penfield Crescent, Brighton Sta., Rochester 10, N.Y. 1927.
Annan, Ormsby, 1059 Chatfield Rd., Winnetka, Ill. 1951.
Antevs, Mrs. Ada, "The Corral," Globe, Ariz. 1946 (1947) [L.].
Appel, Thomas G., 63 Sunnyside Ave., Pleasantville, N.Y. 1951.
Applegarth, John H., 32 S. Greene St., Baltimore, Md. 1937.
Appleton, J. S., R.F.D., Simi, Calif. 1901 (1920) [L.].
Arbib, Robert S., Jr., 231 W. Lena Ave., Freeport N.Y. 1947.
Arend, Philip H., Rt. 1, Box 575-H, Alpine, Calif. 1949.
Armington, Sven, Box 19081, Stockholm 19, Sweden. 1951.
Armstrong, Herbert A., Bly, Ore. 1951.
Armstrong, Virginia, Musketaguid Rd., Concord, Mass. 1947.
Arnold, John R., 834 W. Mariposa St., Stockton, Calif. 1930.
Arnold, Lee W., Waubay National Wildlife Refuge, Waubay, So. Dak. 1929.
Arnold, Ralph, 1205 Wilson, San Marino, Calif. 1893.
Arny, Samuel A., 817 S. Florida St., Apt. 6, Arlington 4, Va. 1947.
Aronoff, Arthur E., 59 W. 71st St., New York, N.Y. 1948.
Arons, Paul, 13956 Magnolia Ave., Van Nuys, Calif. 1951.
Ashcraft, Granville P., Weaverville, Calif. 1928-29, 1940.
Ashley, James F., 740 Santa Clara Ave., Alameda, Calif. 1933.
Atkins, Mrs. Carolyn C., 917 Carlisle, Albuquerque, N.M. 1949.
Atkinson, W. L., 105 S. 14th St., San Jose 11, Calif. 1901.
Atsatt, Sarah R., 405 Hilgard Ave., Los Angeles 24, Calif. 1911.
Attebery, Howard R., 4829 Santa Monica Ave., San Diego 7, Calif. 1950.
Auchincloss, Bayard C., 1711 Guilford Lane, Oklahoma City, Okla. 1951.
Augustson, G. F., 315 S. J St., Madera, Calif. 1942.
Austin, Mrs. Harold C., 1116 Mandana Blvd., Oakland 10, Calif. 1939.
Austin, John B., 9 Chamounix Rd., St. Davids, Pa. 1948.
Austin, Oliver L., 28 Fairview Ave., Tuckahoe 7, N.Y. 1931.
Austin, Oliver L., Jr., 28 Fairview Ave., Tuckahoe 7, N.Y. 1933.
Averitt, Max W., Special Services Sec., APO 929, % Postmaster, San Francisco, Calif. 1950.
Ayer, Mrs. N. Edward, 1300 Hillcrest Dr., Pomona, Calif. 1929.

B

Badger, M. C., Rt. 1, Box 98, Santa Paula, Calif. 1915.
Bagg, Aaron M., 72 Fairfield Ave., Holyoke, Mass. 1952.
Bailey, Alfred M., Colorado Museum of Natural History, Denver 6, Colo. 1917.
Bailey, Laura B., Rockbridge, Alum Springs, Rt. 2, Goshen, Va. 1915 (1920) [L.].
Bailey, Richard, 1107 High Court, Berkeley 8, Calif. 1949.
Bailey, Robert E., Inst. Exp. Biology, Univ. California, Berkeley 4, Calif. 1949.
Bailey, Seth T., 1424 Bay St., Alameda, Calif. 1948.
Baily, A. Lang, III, R. D. 3, Box 136-B, Littleton, Colo. 1952.
Baily, Fisher C., 1229 Ralston St., Reno, Nev. 1945.
Baker, John H., 1165 5th Ave., New York 28, N.Y. 1930.
Baker, Mildred E., 275 Hillcrest Dr., Encinitas, Calif. 1948.
Baker, Paul S., 5545 Stonegate Dr., Dallas, Tex. 1945.
Baker, Rollin H., Museum Natural History, Univ. Kansas, Lawrence, Kan. 1946.
Baldwin, Paul H., Dept. Zoology, Colorado A. & M. College, Fort Collins, Colo. 1943.
Ball, Grace E., 165 Eldridge St., Mill Valley, Calif. 1947.
Balsom, Mrs. Amos P., 2209 E. Stratford Court, Milwaukee 11, Wis. 1948.
Baltzar, Mrs. Evelyn C., P. O. Box F, Los Angeles 41, Calif. 1946.
Bamford, Mrs. G. L., 1428 Castro St., Oakland 12, Calif. 1918.

Bard, Fred G., Normal School Bldg., Regina, Saskatchewan, Canada. 1948.
Barnes, Charles K., 5006 S. Michigan Rd., South Bend, Ind. 1947.
Barnes, Clarence A., 3742 Coldwater Canyon Ave., North Hollywood, Calif. 1948.
Barnes, Dale K., 1102 Neilson St., Albany, Calif. 1939.
Barnes, F. R., 4282 Maple Ave., Oakland 2, Calif. 1947.
Barrett, Vernon, 714 W. Olympic, Los Angeles 15, Calif. 1948.
Bartel, James N., 1112 Wisconsin St., Apt. 1, Pomona, Calif. 1951.
Bartholomew, George A., Jr., Dept. Zoology, Univ. Calif., Los Angeles 24, Calif. 1942.
Bartlett, Frank A., 2435 N. E. 60th Ave., Portland 13, Ore. 1951.
Barton, Sherman S., 638 Adams St., Ogden, Utah. 1949.
Bass, Mrs. Ruth L., 2804 Highview Ave., Altadena, Calif. 1951.
Bassett, Frank N., 722 N. Orange Dr., Los Angeles 38, Calif. 1919.
Batchelder, Charles F., 7 Kirkland St., Cambridge 38, Mass. 1910.
Battles, Carroll D., 2347 S. Highland Ave., Los Angeles 16, Calif. 1924.
Batts, Henry L., Jr., 1211 Glenwood Ave., Kalamazoo, Mich. 1947.
Baumgardt, John, 523 Santa Rosa, Arcadia, Calif. 1937.
Baumgarten, Mrs. Gail, 258 Almont Dr., Beverly Hills, Calif. 1950.
Baxter, William, 1011 Trenton Pl., Wilmington, Del. 1947.
Beasley, Clarence C., 614 California Ave., Santa Monica, Calif. 1947.
Beebe, Hiram E., 1847 N. Wilcox Ave., Hollywood 28, Calif. 1948.
Beebe, William, 33 W. 67th St., New York 23, N.Y. 1926.
Beecher, William J., Chicago Natural History Museum, Chicago 5, Ill. 1948.
Beemer, Mrs. Eleanor G., Pauma Valley, Pala, Calif. 1946.
Behle, William H., Dept. Biology, Univ. Utah, Salt Lake City, Utah. 1933.
Beidleman, R. G., Zoology Dept., Colorado A. & M. College, Fort Collins, Colo. 1948.
Belcher, Sir Charles F., Kinangop, Kenya, East Africa. 1948.
Belcher, Paul E., 988 Jefferson Ave., Akron 2, Ohio. 1945.
Bell, A. Weir, 365 S. Hoover St., Los Angeles 5, Calif. 1922-23, 1936.
Bell, Mrs. H. M. S., 742 St. Patrick St., Victoria, B. C., Canada. 1951.
Belt, R. Elmer, 1893 Wilshire Blvd., Los Angeles 5, Calif. 1942.
Bender, Richard O., Cobb's Mill Rd., R. D. 1, Bridgeton, N. J. 1951.
Benjamin, Gilbert G., Jr., Apt. 102, 2107 Hildarose Dr., Silver Spring, Md. 1939.
Bennett, Mary A., West Illinois State College, Macomb, Ill. 1948.
Bennett, Walter W., 5617 Harcourt Ave., Los Angeles 43, Calif. 1934.
Benson, Seth B., Museum Vertebrate Zoology, Univ. California, Berkeley 4, Calif. 1927.
Bent, A. C., 140 High St., Taunton, Mass. 1909 (1922) [L.] (1933) [Honorary].
Bentinck, Adrienne C., 2420 Scout Rd., Oakland 11, Calif. 1951.
Berger, Andrew J., Dept. Anatomy, East Medical Bldg., Univ. Michigan, Ann Arbor, Mich. 1947.
Bergmann, William E., Jr., 6719 Betts Ave., North College Hill 24, Ohio. 1951.
Bergstrom, E. Alexander, 37 Old Brook Rd., West Hartford 7, Conn. 1942.
Berkey, Glen T., 22 S. State St., Rittman, Ohio. 1951.
Berry, Mrs. Alison, 85 Menlo Pl., Berkeley 7, Calif. 1950.
Berry, Arthur L., 715 Orange Grove, Alhambra, Calif. 1942.
Berry, William D., 3015 W St., Sacramento, Calif. 1951.
Bibbee, Paul C., Box 65, Athens, West Va. 1947.
Biddle, John A., 418 Westbourne St., La Jolla, Calif. 1947.
Bixler, Francis A., Box 1231, Powers, Ore. 1950.
Black, Mrs. O. F., 25 Panoramic Way, Berkeley 4, Calif. 1951.
Blain, Alexander W., 2201 Jefferson Ave., East, Detroit 7, Mich. 1926.
Blake, Charles H., Woodland Way, Lincoln, Mass. 1947.
Blanchard, Barbara D., Dept. Biological Sciences, Santa Barbara State College, Santa Barbara, Calif. 1930.
Blanchard, Dean H., 729 Mission Canyon Rd., Santa Barbara, Calif. 1930.
Bleitz, Don, 2047 Castilian Dr., Hollywood 27, Calif. 1944.
Bolander, Gordon L., 538 Flower Ave., Santa Rosa, Calif. 1943.
Bond, Richard M., Virgin Islands Corporation, Christiansted, St. Croix, U. S. Virgin Islands. 1936.
Booth, Ernest S., Dept. Biology, Walla Walla College, College Place, Wash. 1939.
Borell, Adrey E., Box 1348, Soil Conservation Service, Albuquerque, N. M. 1918.
Bosbyshell, F. H., 545 S. Figueroa St., Los Angeles 17, Calif. 1951.
Boulton, Rudyerd, 3317 Dent Pl., Washington 7, D. C. 1939.

Bourne, Raymond D., Box 187, Oxford, Ohio. 1947 (1951) [L.].
Bowdish, B. S., Desmarest, N. J. 1910.
Bowen, Lydia S., 841 Earlham St., Pasadena 4, Calif. 1948.
Bowers, Darl E., 2111½ McGee St., Berkeley 3, Calif. 1949.
Bowers, J. Basil, 381 51st St., Oakland 9, Calif. 1947.
Bowman, Robert I., Museum Vertebrate Zoology, Univ. California, Berkeley 4, Calif. 1948.
Bowman, Thomas E., 4418 Marseilles St., San Diego 7, Calif. 1947.
Boyde, Mrs. C. M., Box 132, Fort Logan, Colo. 1937.
Boyd, Elizabeth M., Zoology Dept., Mt. Holyoke College, South Hadley, Mass. 1948.
Boyle, Ashby D., 61 University St., Salt Lake City, Utah. 1915.
Boyne, Elmer M., 624 Nixon, Reno, Nev. 1951.
Boynton, F. H., 163 State St., Pasadena 2, Calif. 1948.
Bracelin, Mrs. H. P., 2214 Vine St., Berkeley 4, Calif. 1930.
Brackbill, Hervey G., 4608 Springdale Ave., Baltimore 7, Md. 1945.
Braman, Mrs. Myrtle, 206 W. Stayton Ave., Victoria, Tex. 1947.
Bramkamp, Mrs. Lynn, 260 Wildwood Ave., Piedmont 10, Calif. 1951.
Brandt, Herbert W., 2425 N. Park Blvd., Cleveland 6, Ohio. 1914.
Brauner, Joseph, 11233 Van Buren Ave., Los Angeles 44, Calif. 1946.
Brecher, Mrs. John, 70 Panoramic Way, Berkeley 4, Calif. 1952.
Breer, Thomas C., Menlo College, Menlo Park, Calif. 1950.
Brenneman, Doris M., 1740 Walnut St., Berkeley 9, Calif. 1951.
Briggs, Marjorie A., Dept. Biology, Univ. Florida, Gainesville, Fla. 1952.
Brigham, H. Storrs, Jr., 3817 Sedgwick Ave., New York 63, N.Y. 1947.
Brittan, Martin R., Dept. Zoology, San Diego State College, San Diego 5, Calif. 1948.
Bro, Lysle W., Jr., 236 Palisades Ave., Santa Monica, Calif. 1952.
Broadbooks, Harold E., Dept. Zoology, Univ. Arizona, Tucson, Ariz. 1942.
Brode, J. Stanley, Santa Monica Junior College, Santa Monica, Calif. 1934.
Brodkorb, Pierce, Dept. Biology, Univ. Florida, Gainesville, Fla. 1940.
Brodrick, Mrs. Neva, 721 Cleveland Ave., Oakland 6, Calif. 1949.
Broline, Mrs. Signa L., 829 E. Claremont St., Pasadena 6, Calif. 1948.
Brooks, Matilda M., 630 Woodmont Ave., Berkeley, Calif. 1949.
Brooks, William E., Rt. 1, Box 100, Colton, Calif. 1940.
Brown, Asa L., Janesville, Calif. 1938.
Brown, Jerram L., 19 Hitchcock Rd., Amherst, Mass. 1952.
Brown, Nellie M., 409 S. St. Andrews Pl., Los Angeles 5, Calif. 1922.
Brown, Ollie D., 8964 Wonderland Ave., Los Angeles 46, Calif. 1952.
Brown, Mrs. Thomas H., 9814 Estrella Dr., Spring Valley, Calif. 1946.
Browne, Andrew C., 1200 Woodland Ave., Palo Alto, Calif. 1950.
Browne, Mrs. George C., 2435 Ivy Dr., Oakland 6, Calif. 1947.
Brubaker, Mrs. Lester H., 191 Mountain View Ave., San Jose 27, Calif. 1952.
Bruns, James H., St. Francisville, La. 1949.
Bryant, Harold C., Grand Canyon National Park, Ariz. 1910 (1920) [L.].
Bryant, Wayne W., Box 211, Yosemite National Park, Calif. 1952.
Bryens, Oscar McK., 231 S. Main St., Three Rivers, Mich. 1927.
Buckman, George, 47 Bonnie Brae Lane, Berkeley 9, Calif. 1927.
Buffum, Austin G., 8024 Melrose Ave., Los Angeles 46, Calif. 1950.
Bull, D. Bernard, P. O. Box 306, La Mesa, Calif. 1950.
Bumbaugh, Ethel, 394 Orange St., Oakland 10, Calif. 1949.
Bunnell, Sterling, 2000 Broadway, San Francisco, Calif. 1952.
Burch, Jean, 43 Douglas Rd., Belmont 78, Mass. 1952.
Burch, Mrs. John Q., 4206 Halldale Ave., Los Angeles 37, Calif. 1947.
Burdick, Donald J., 1148 Martin Ave., San Jose 11, Calif. 1949.
Burt, William H., Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1928.
Burtis, Prentis T., 2500 Edwards Ave., El Cerrito, Calif. 1949.
Bushman, John B., 1621 Major St., Salt Lake City 15, Utah. 1952.
Butler, Mrs. May F., John Day, Ore. 1947.
Butler, Thomas S., 2971 San Isabel Ave., Pueblo, Colo. 1951.
Byrd, Mitchell A., Co-operative Wildlife Research Unit, Virginia Polytechnic Inst., Blacksburg, Va. 1951.
Byrne, Hugh D., 2529 W. Ave. 33, Los Angeles 65, Calif. 1952.

C

Cade, Tom, 406-A Palm Dr., Glendale, Calif. 1950.
Cady, Walter G., Norman Bridge Laboratory, California Inst. Technology, Pasadena 4, Calif. 1951.

Cahalane, Victor H., National Park Service, South Interior Bldg., Washington 25, D. C. 1938.

Calder, James A., Buena Park, Calif. 1917-37, 1940.

Camp, Charles L., Museum Paleontology, Univ. California, Berkeley 4, Calif. 1909.

Campbell, A. L., 9434 S.W. Capitol Highway, Portland 19, Ore. 1951.

Campbell, Ruth, 1810 Virginia St., Berkeley 3, Calif. 1952.

Campbell, Mrs. William H., Box 116, Kings Canyon Rd., Carson City, Nev. 1940.

Campbell, William I., 9 Barnesdale Ave., South, Hamilton, Ontario, Canada. 1948.

Caprini, Mrs. Gladys M., 1807 Sacramento St., Vallejo, Calif. 1950.

Cardiff, Bruce E., R.F.D. 1, Rialto, Calif. 1948.

Cardiff, Eugene E., R.F.D. 1, Rialto, Calif. 1947.

Carey, Joshua H., Dept. Neurology, Univ. Hospital, Ann Arbor, Mich. 1936.

Carnie, S. Kent, 1249 Latham St., Mountain View, Calif. 1945.

Carpenter, Mrs. Fred A., 1430 Le Roy Ave., Berkeley 8, Calif. 1930.

Carpenter, Nelson K., 5026 Westminster Ter., San Diego 4, Calif. 1901.

Carson, Carl L., 67 Duncan Way, Oakland 11, Calif. 1948.

Carter, Frances, 2200 College Ave., Berkeley 4, Calif. 1934.

Carter, T. C., 729 Locust St., Alva, Okla. 1948.

Cassel, J. Frank, Dept. Zoology, North Dakota Agr. College, Fargo, N. D. 1946.

Caswell, Herbert H., Jr., Zoology Dept., Cornell University, Ithaca, N.Y. 1950.

Cawelti, Wilfred E., Box 322, Maricopa, Calif. 1941.

Chalif, Edward L., 37 Barnsdale Rd., Short Hills, N. J. 1948 (1952) [L.].

Chambers, Carl W., 514 Marquette St., Pacific Palisades, Los Angeles, Calif. 1936.

Chambers, W. Lee, Robinson Road, Topanga, Calif. 1897 (1919) [L.] (1936) [Honorary].

Chapman, Larry E., 3822 Randolph Ave., Oakland 2, Calif. 1952.

Chapman, Lawrence B., R.F.D. Hubbardston, Mass. 1949.

Charde, Newell, 1518 E. Wilson, Glendale 6, Calif. 1952.

Chattin, John E., 6521 Dana St., Oakland 9, Calif. 1947.

Chattin, Susan E., Museum Vertebrate Zoology, Berkeley 4, Calif. 1927.

Cheesman, Harvey R., 422-B Allen, Glendale, Calif. 1946.

Childs, Henry E., 335 Pleasant St., Rumford 16, R. I. 1948.

Childs, Henry E., Jr., San Joaquin Experimental Range, O'Neals, Calif. 1947.

Christman, Gene M., Museum Vertebrate Zoology, Berkeley 4, Calif. 1946.

Church, Charles T., 70 Pine St., New York 5, N.Y. 1940.

Chynoweth, B. G., 832 San Luis Rd., Berkeley 7, Calif. 1947.

Clabaugh, Ernest D., 44 Lenox Rd., Berkeley 8, Calif. 1924 (1924) [L.].

Clark, Donovan L., 1130½ W. 90th St., Los Angeles, Calif. 1951.

Clark, Harold W., Angwin, Napa Co., Calif. 1925-43, 1948.

Clarke, Oscar F., 1012 Indianapolis Ave., Riverside, Calif. 1951.

Clarke, William S., Jr., Box 167, State College, Pa. 1948.

Clarkson, Mrs. Edwin O., Wing Haven, 248 Ridgewood Ave., Charlotte, N. C. 1945.

Clary, Mrs. Marjorie D., 7630 Cimarron St., Los Angeles 47, Calif. 1929.

Clattenburg, Albert E., Jr., American Consulate General, Montreal, Quebec, Canada. 1947.

Claxton, Fritz R., 2516 Etna St., Berkeley 4, Calif. 1949.

Clay, C. Irwin, Box 353, Eureka, Calif. 1910 (1923) [L.].

Clear, Blanche O., 1730 Scenic Ave., Berkeley 9, Calif. 1951.

Cleary, John J., 1851 Braeburn Rd., Altadena, Calif. 1949.

Clements, H. Everest, 49 Stoneham Rd., Rochester 10, N.Y. 1951 (1951) [L.].

Clements, William F., 510 S. Spring St., Los Angeles 13, Calif. 1952.

Clements, Wynona, 130E Hillcrest Blvd., Apt. E., Inglewood, Calif. 1941.

Clotfelter, James W., 211 Doyle Ave., Paris, Ky. 1951.

Clow, Marion, P. O. Box 163, Lake Forest, Ill. 1945.

Coggins, Herbert L., 1157 Filbert St., San Francisco 9, Calif. 1910.

Cogswell, Howard L., Museum Vertebrate Zoology, Berkeley 4, Calif. 1940.

Cohen, Ethel H., 2916 W. 14th St., Los Angeles 6, Calif. 1951.

Coil, E. Fisher, 1867 Fort Stockton Dr., San Diego 3, Calif. 1951.

Colburn, A. E., 3100 Wilshire Blvd., Los Angeles 5, Calif. 1905 (1915) [L.].

Coles, Victor, Teachers College, Univ. Cincinnati, Cincinnati 21, Ohio. 1947.

Collins, Percy L., 18 Vanderbilt Ave., Milltown, N. J. 1951.

Colton, Harold S., Museum Northern Arizona, Flagstaff, Ariz. 1936.

Colton, John B., 3914 Wabash St., San Diego, Calif. 1951.

Combellack, Mrs. C. Rose B., 3021 Friendly St., Eugene, Ore. 1952.
Comby, Julius H., 10044 Kratt Lane, Whittier, Calif. 1939.
Compton, Lawrence V., Biology Div., Soil Conservation Service, Washington 25, D. C. 1927.
Conan, Norman G., 1789 Fiske Ave., Pasadena 6, Calif. 1951.
Cone, Hutchinson I., Jr., Gen. Del., Ponte Vedra Beach, Fla. 1940.
Congdon, Russell T., Medical Arts Bldg., Wenatchee, Wash. 1945.
Connell, Isabelle, P. O. Box 116, Spadra, Calif. 1948.
Connell, Joseph H., 5528 Beverly Pl., Pittsburgh, Pa. 1947.
Cook, Mrs. Wilma B., "The Pine Cone," Box G-1, Carmel, Calif. 1947.
Cooper, Mrs. James S., 310 Howard Ave., Piedmont 11, Calif. 1944.
Cottam, Clarence, Fish and Wildlife Service, Dept. Interior, Washington 25, D. C. 1926.
Cottrell, George W., Jr., 70 Lake View Ave., Cambridge 38, Mass. 1945.
Couffer, Jack C., 2041 El Arbolita Dr., Glendale 8, Calif. 1942.
Coursen, G. Blair, 761 E. 69th Pl., Chicago 37, Ill. 1929.
Court, Edward J., 1723 Newton St., N.W., Mt. Pleasant, Washington, D. C. 1947.
Courtright, Mrs. Mary L., 3 Elm Ave., Larkspur, Calif. 1936.
Covel, Paul F., 2860 Delaware St., Oakland 2, Calif. 1935.
Cowan, Ian McT., Dept. Zoology, Univ. British Columbia, Vancouver, B. C., Canada. 1937.
Cowan, John B., Gray Lodge Refuge, P. O. Box 655, Gridley, Calif. 1946.
Cowles, Raymond B., Zoology Dept., Univ. California, Los Angeles 24, Calif. 1928.
Cox, Mrs. Ruth W., 418 S. Holt Ave., Los Angeles 36, Calif. 1949.
Cramer, Frances L., 921 W. 36th Pl., Los Angeles 7, Calif. 1940 (1943) [L.].
Crane, Clarence, Jr., Ferndale, Calif. 1947.
Crawford, Franklin G., 2782 Glen Ave., Altadena, Calif. 1939.
Creager, Joe C., L. A. Cann Dr., Drawer 1267, Ponca City, Okla. 1948.
Crockett, Harry L., 76 E. Columbus Ave., Phoenix, Ariz. 1924.
Crompton, Alfred O., Lausii Ave., Salisbury, South Australia. 1948.
Cross, Frank C., 9413 2nd Ave., Silver Spring, Md. 1950.
Crouch, James E., San Diego State College, San Diego, Calif. 1934.
Crymes, Frank H., 503 Beloit Ave., Berkeley 8, Calif. 1947.
Culbertson, A. E., Fresno State College, Fresno 4, Calif. 1937.
Cunningham, James W., 3009 E. 19th Terr., Kansas City, Mo. 1945.
Cunningham, John D., 1311 5th St., Santa Monica, Calif. 1952.
Curl, A. Lawrence, 7360 Rockaway Ave., El Cerrito, Calif. 1947.
Curtis, Elizabeth L., 5648 Beach Dr., Seattle 6, Wash. 1933.
Curtis, Mrs. Vee K., 1450 Bancroft Way, Berkeley, Calif. 1945.
Cushing, John E., Jr., 15 El Bosque Rd., Santa Barbara, Calif. 1934.
Cutcher, Elsie R. A., "Yarrabin," Croudace St., New Lambton, N. S. W., Australia. 1948.
Cutress, Charles E., 5620 S. E. Aldercrest Rd., Milwaukie, Ore. 1947.

D

Dahl, Richard G., 85 Bryon Dr., Concord, Calif. 1938.
Dale, Frederick H., Patuxent Research Refuge, Laurel, Md. 1937.
D'Angelo, Angelo R., 809 Palisade Ave., Union City, N. J. 1947.
Daniels, George G., 22 W. Beechcroft Rd., Short Hills, N. J. 1948.
Darby, Rollo E., 2103 Walnut Ave., Carmichael, Calif. 1946.
Darcus, S. J., Box 2206, R.R. 1, Penticton, B. C., Canada. 1950.
Dasmann, Raymond F., Museum Vertebrate Zoology, Berkeley 4, Calif. 1948.
Daugherty, Mrs. Caroline H., 941 Sherlock Dr., Burbank, Calif. 1947.
Davenport, M. Christine, 817 Terraine Ave., Long Beach, Calif. 1952.
Davidson, John B., 327 Driftwood Rd., Corona del Mar, Calif. 1950.
Davidson, W. M., 1504 Bodell St., Orlando, Fla. 1947.
Davis, Carroll L., Rm. 31, Central Dorm., Corvallis, Ore. 1947.
Davis, Clifford V., Montana State College, Bozeman, Mont. 1948.
Davis, David E., 615 N. Wolfe St., Baltimore 5, Md. 1936.
Davis, Edwin G., 4638 28th Rd. S., Arlington, Va. 1947.
Davis, John, Moore Ornithological Laboratory, Box 388, Occidental College, Los Angeles 41, Calif. 1938.
Davis, John M., 1695 Hampton Ave., Redwood City, Calif. 1908.
Davis, L. Irby, Box 988, Harlingen, Tex. 1940.
Davis, Platt, 117 E. 1st St., Albany, Ore. 1951.
Davis, William B., Box 254, Faculty Exchange, College Station, Tex. 1930 (1950) [L.].

Dawson, Richard G., 6114 Indiana Ave., Kansas City 4, Mo. 1949.

Dawson, William R., 10474½ Eastbourne Ave., Los Angeles 24, Calif. 1945.

Day, Leonard H., 212 E St., Davis, Calif. 1944.

Deane, Mrs. Ruthven, 830 Hibbard Rd., Winnetka, Ill. 1939 (1939) [L.].

DeGroot, Dudley S., 424 S. Hermosa, Albuquerque, N. M. 1916.

Dehnel, Paul A., 1427½ 7th St., Santa Monica, Calif. 1947.

Deignan, Herbert G., Smithsonian Institution, Washington 25, D. C. 1949.

Delacour, Jean, Los Angeles County Museum, Exposition Park, Los Angeles 7, Calif. 1927 (1949) [L.].

del Campo, Rafael M., Instituto de Biologia, Casa del Lago, Chapultepec, D. F., Mexico. 1948.

del Toro, Miguel A., Apartado Postal No. 6, Tuxtla, Gutierrez, Chiapas, Mexico. 1948.

De Lury, Ralph E., 330 Fairmont Ave., Ottawa, Ontario, Canada. 1926.

DeMay, Mrs. Maybelle, 504 E. Oak Ave., El Segundo, Calif. 1951.

Denham, Reginald, 100 Central Park South, New York 19, N.Y. 1948.

Denman, Clayton C., 1751 Naomi Pl., Seattle 5, Wash. 1949.

Dennis, Robert, 135 Purdue Ave., Berkeley, Calif. 1952.

Denton, J. Fred, 1510 Pendleton Rd., Augusta, Ga. 1949.

Desmond, Thomas C., Box 670, Newburgh, N.Y. 1945 (1948) [L.].

DeSchauensee, R. M., Devon, Pa. 1950.

Deuel, Harold F., 110 Hill St., Arcata, Calif. 1951.

Deuprey, Mrs. Clifton S., 542 Johnson St., Healdsburg, Calif. 1935.

DeVoe, Richard H., Rt. 1, Box 1, Morgan Hill, Calif. 1950.

Dexter, B. D., 2519 Ashby Ave., Berkeley 5, Calif. 1928.

DeYoung, Chris E., 1253 College Way, Ontario, Calif. 1951.

Dick, John H., Dixie Plantation, Meggett, S. C. 1951.

Dickerman, Robert W., Arizona Co-operative Wildlife Unit, Univ. Arizona, Tucson, Ariz. 1951.

Dicks, E. Ford, 8374 6th Ave., Tacoma 6, Wash. 1948.

Diem, Kenneth L., Royal Morris Ranch, Snowville, Utah. 1948.

Dietz, Curt, Box 1753, Stanford University, Calif. 1950.

Dire, William W., 127 N. Humphrey Ave., Oak Park, Ill. 1949.

Dixon, James B., Rt. 3, Box 1143, Escondido, Calif. 1924.

Dixon, James E., R.F.D. 1, Box 429, Escondido, Calif. 1948.

Dixon, Joseph S., Box 357, Star Rt., Escondido, Calif. 1904 (1947) [Honorary].

Dixon, Keith L., Museum Vertebrate Zoology, Univ. California, Berkeley 4, Calif. 1943.

Dixon, Ralph E., Box 810, Star Rt., Escondido, Calif. 1935.

Dobson, Jerome J., Rt. 1, Box 144, Exeter, Calif. 1951.

Dodson, Mrs. Leigh M., 1046 Holt Ave., Los Angeles 35, Calif. 1929.

Doering, Hubert R., 414 Rivard Blvd., Grosse Pointe 30, Mich. 1946.

Doggett, William, 2125 Union St., Eureka, Calif. 1952.

Donnagho, Walter R., 4732 21st Ave., Seattle 5, Wash. 1947.

Dresser, Mrs. James D., Jr., 9620 Von Thaden, Rt. 4, Wichita 15, Kan. 1951.

Douglas, William E., 340 Oak Park Blvd., Walnut Creek, Calif. 1943.

Driver, E. Raymond, Box 234, Old Stage Rd., Central Point, Ore. 1940.

Drummond, Charles T., Rt. 1, Box 93, Montague, Calif. 1952.

DuBois, Alexander D., Christmas Lake Road, Rt. 2, Excelsior, Minn. 1911.

Du Bois, H. M., Rt. 1, Box 370, Clackamas, Ore. 1931.

Duff, C. V., 1922 Tamarind Ave., Hollywood 28, Calif. 1939 (1950) [L.].

Duff, James V., 1922 Tamarind Ave., Hollywood 28, Calif. 1946.

Duffield, Mrs. J. W., Institute of Forest Genetics, Placerville, Calif. 1937.

Duffy, John J., Jr., 1707 S. Henning Ave., Evansville, Ind. 1951.

Dumas, Philip C., Oregon State College, Corvillis, Ore. 1950.

Du Mont, Philip A., 4114 Fessenden St., N. W., Washington 16, D. C. 1932.

Dunlap, Mrs. Ava K., 2817 Woolsey St., Berkeley 5, Calif. 1947.

Dunlap, Luther, 2817 Woolsey St., Berkeley 5, Calif. 1950.

Dunlap, Walter K., 103 Ardmore Rd., Berkeley 7, Calif. 1952.

Durham, Floyd E., 1822 Potrero Grande, San Gabriel, Calif. 1940.

Duvall, Allen J., Fish and Wildlife Service, Washington 25, D. C. 1946.

E

Eaton, Stephen W., Dept. Biological Sciences, St. Bonaventure University, St. Bonaventure, N.Y. 1948.

Eberhardt, Robert L., 804 30th St., San Pedro, Calif. 1948.

Ebert, Mrs. Ruth B., 3540 Pierce St., San Francisco 28, Calif. 1941.

Eckart, Mrs. Mayken, Dutch Flat, Placer Co., Calif. 1951.

Eckelberry, Don R., 4 Foster Lane, Babylon, L. I., N.Y. 1948.

Eddy, Garret, 4515 Ruffner St., Seattle 99, Wash. 1947.

Edens, Mrs. La Prelle, 4415 W. 5th St., Los Angeles 5, Calif. 1949.

Edge, Mrs. Charles N., 1215 5th Ave., New York 29, N.Y. 1932.

Edge, Elton R., 767 Scott Ave., San Bernardino, Calif. 1932-40. 1950.

Edmunds, Jane C. D., Linfield College, McMinnville, Ore. 1948.

Edson, J. M., 336 W. 50th St., Seattle 7, Wash. 1911.

Edwards, Alfred C., Box 555, Williams, Ariz. 1950.

Edwards, C. B., Box 105, Jamul, Calif. 1949.

Eichler, Herbert P., 2211 Andrews Ave., New York 53, N.Y. 1947.

Einarsen, Arthur S., 9 Edgewood Way, Corvallis, Ore. 1936.

Einhorn, Benjamin, 7 Parker Ave., Deal 1, N. J. 1947.

Eisenmann, Eugene, 11 Broadway, New York 4, N.Y. 1948 (1948) [L.].

Eklund, Carl M., Rocky Mountain Laboratory, Hamilton, Mont. 1951.

Eliot, Theodore L., Belvedere, Marin Co., Calif. 1947.

Eliot, W. A., 2310 S. Gilpin St., Denver 10, Colo. 1952.

Elmore, Louis A., 2002 Yolo Ave., Berkeley 7, Calif. 1935.

Emerson, Guy, 16 E. 11th St., New York 3, N.Y. 1936.

Emilio, S. Gilbert, Rt. 4, Laconia, N. H. 1926.

Emlen, John T., Jr., Dept. Zoology, Univ. Wisconsin, Madison 6, Wis. 1930.

England, Ewin G., Jr., P. O. Box 28, Durham, Calif. 1940.

English, P. F., Dept. Zoology, Pennsylvania State College, State College, Pa. 1945.

Erickson, John G., 611 N. Lilac Dr., Minneapolis 22, Minn. 1951.

Erickson, Mary M., 3505 Foothill Rd., Santa Barbara, Calif. 1930.

Erickson, Ray C., Box 113, Malheur National Wildlife Refuge, Burns, Ore. 1949.

Erlanger, Mrs. Milton, Box 305, Elberon, N. J. 1948.

Erwin, Robert J., 149 31st St., Ogden, Utah. 1948.

Esteban, Juan G., Instituto Miguel Lillo, Miguel Lillo 205, Tucuman, Argentina. 1949 (1949) [L.].

Evenden, Fred G., Jr., Fish and Wildlife Service, P. O. Box 1317, Sacramento 6, Calif. 1944.

Ewan, Joseph A., Dept. Botany, Tulane Univ., New Orleans, La. 1937.

Ewing, Eva C., 1205 Muirlands Dr., La Jolla, Calif. 1950.

Eyster, Marshall B., Dept. Biology, Southwestern Louisiana Institute, Box 545, Lafayette, La. 1951.

F

Fadness, Mrs. Eleanor B., 1142 Freeman Ave., Long Beach 4, Calif. 1950.

Failing, Robert, 3949 Harmon Rd., El Sobrante 11, Calif. 1933.

Fairbanks, Mrs. Paul H., U. S. Forest Service, Miramonte, Calif. 1952.

Fairchild, James B., 2750 Orange St., Riverside, Calif. 1941.

Falconer, Donald M., 37 Saddleback Rd., Rolling Hills, Calif. 1950.

Fargo, William G., 506 Union St., Jackson, Mich. 1928.

Farner, Donald S., Dept. Zoology, State College of Washington, Pullman, Wash. 1945.

Farrington, S. Kip, Jr., Main St., East Hampton, L. I., N.Y. 1952.

Fay, Jean B., Santa Barbara Public Library, Santa Barbara, Calif. 1946.

Featherstone, Mrs. W. H., 132 King St., Wallace, Ida. 1951.

Fennell, Chester M., 21475 Hillsdale Ave., Fairview Park 26, Ohio. 1950.

Ferguson, Denzel E., 142 Kings Rd., Corvallis, Ore. 1951.

Findley, James C., Museum Natural History, Univ. Kansas, Lawrence, Kan. 1952.

Field, Clyde L., 2534 K Ave., National City, Calif. 1919.

Field, Mrs. Ruby H., 1600 Espinosa Circle, Palos Verdes Estates, Calif. 1949.

Finley, Robert B., Jr., Museum Natural History, Univ. Kansas, Lawrence, Kan. 1946.

Finninger, Paul C., Mexico City College, Mexico, D. F., Mexico. 1950.

Fischer, Rudolph, 215 E. Foothill Blvd., La Verne, Calif. 1947.

Fish, William R., 302-B Entwistle St., China Lake, Calif. 1948.

Fisher, Edna M., 2410 Fulton St., Berkeley 4, Calif. 1923.

Fisher, Harvey I., Dept. Zoology, Univ. Illinois, Urbana, Ill. 1939.

Fisher, James, Old Rectory, Ashton, Northampton, England. 1951.

Fisher, Walter K., Hopkins Marine Station, Pacific Grove, Calif. 1901 (1952) [Honorary].

Fitch, Henry S., Univ. Kansas Natural History Reservation, Route 3, Lawrence, Kan. 1933.

Fitzpatrick, Walter J., Yosemite National Park, Calif. 1947.

Fitzsimmons, E. R., 1414 Bonita, Berkeley 9, Calif. 1952.
Fluekiger, Dora W., Hotel Dauphin, Broadway at 67th, New York 23, N.Y. 1948.
Foerster, William K., Jackman, Me. 1952.
Follett, W. I., 3501 Broadway, Oakland 11, Calif. 1926 (1949) [L.].
Forbes, John R., 2751 Stockton Blvd., Sacramento, Calif. 1951.
Ford, Mary C., 2360 Scout Rd., Oakland 11, Calif. 1951.
Fordham, Stephen C., Jr., Delmar Game Farm, Delmar, N.Y. 1947.
Foree, Mrs. Eve, 266 Lennox Ave., Oakland 10, Calif. 1950.
Foree, Lynn, 379 30th St., Oakland 9, Calif. 1950.
Forward, Mrs. Tracy C., Ione, Colo. 1952.
Fosberg, Maynard, Rt. 4, Box 460, Turlock, Calif. 1941.
Foster, Thomas H., West Rd., Bennington, Vt. 1951.
Fox, Wade, Jr., Dept. Zoology, Univ. Southern California, Los Angeles 7, Calif. 1944.
Fredrickson, Richard W., 1335 Vermont St., Lawrence, Kan. 1948.
French, Mrs. C. T., 1801 Las Lomas, Albuquerque, N. M. 1945.
French, Norman R., Dept. Zoology, Univ. Nebraska, Lincoln, Nebr. 1951.
Friedmann, Herbert, U. S. National Museum, Washington, D. C. 1927.
Fritz, Mrs. Esther C., 102 The Uplands, Berkeley 5, Calif. 1935.
Froelich, Mrs. David, 321 El Cerrito St., Piedmont, Calif. 1949.
Frohling, Ensign Robert C., U.S.N.R., U.S.S. LSM. 462, F.P.O., San Francisco, Calif. 1951.
Furniss, Owen C., P. O. Box 756, Alberni, B. C., Canada. 1936.

G

Gabrielson, Ira N., Rt. 2, Box 195, Vienna, Va. 1919.
Gairloch, Stanley S., R. D. 2, North Scituate, R. I. 1948.
Gallizioli, Steve, Box 5, Pima, Ariz. 1951.
Gallup, Frederick N., P. O. Box 614, Escondido, Calif. 1921-42, 1948.
Gamero, Antonio, 1837 N. Alexandria, Hollywood 27, Calif. 1949 (1950) [L.].
Gammell, Robert T., Kenmare, N. D. 1945.
Ganier, Albert F., 2112 Woodlawn Dr., Nashville 5, Tenn. 1939.
Gardner, Erle S., Rancho del Paisano, Temecula, Calif. 1948.
Garner, William V., 447 E. Wadsworth St., Philadelphia 19, Pa. 1949.
Garrett, Lois, 1709 Chestnut St., Kenova, West Va. 1949.
Garrity, Devin A., 682 Forest Ave., Rye, N.Y. 1940.
Geist, Otto W., Univ. Alaska, College, Alaska. 1942.
Genelly, Richard E., 3392 Ridge Rd., Lafayette, Calif. 1944.
Gensch, Robert H., Fish and Wildlife Service, 1001 Fidelity Bldg., Kansas City 6, Mo. 1940.
George, John L., Division Conservation, Vassar College, Poughkeepsie, N.Y. 1951.
George, William G., 1062 N. Branciforte Ave., Santa Cruz, Calif. 1941.
Gibb, Andrew S., 2664 Shasta Rd., Berkeley 8, Calif. 1938.
Gibson, Mrs. Carlos E., 9980 Beachy Ave., Pacoima, Calif. 1952.
Gibson, R. H., R. R. 2, Box 336, St. Helena, Calif. 1947.
Gifford, Harold, 3636 Burt St., Omaha 3, Nebr. 1916.
Gift, Cpl. Robert F., AF-13356856, 28-6 Weather Det., APO 125, % P.M., New York, N.Y. 1951.
Giles, LeRoy W., 280 E. Front St., Fallon, Nev. 1952.
Gilhousen, Philip, R. D. 2, Box 428, Arcata, Calif. 1947.
Gilliam, Helen L., 3030 Regent St., Berkeley, Calif. 1937.
Gilliard, E. T., 2253 Edsall Ave., New York 63, N.Y. 1951.
Gladding, Hope M., 970 Miller Ave., Berkeley 8, Calif. 1934.
Glass, Clem C., 4747 Alta Canyada Rd., La Canada, Calif. 1948.
Glover, Fred A., Wildlife Management, Humboldt State College, Arcata, Calif. 1950.
Gloyd, Howard K., 2001 N. Clark St., Chicago 14, Ill. 1937.
Goebel, Herman J., 7852 80th St., Brooklyn 27, N.Y. 1947.
Goelitz, Walter A., Milford, Pa. 1915 (1920) [L.].
Goethe, C. M., Capital National Bank Bldg., 7th and J Sts., Sacramento 14, Calif. 1915-24, 1938.
Goetz, Christian J., 3503 Middleton Ave., Cincinnati, Ohio. 1945.
Golden, Robert V., Rt. 2, Box 709, Los Altos, Calif. 1952.
Goldman, Luther C., Box 739, San Benito, Tex. 1949.
Goldstein, Harry B., 5939 Addison St., Philadelphia 43, Pa. 1949.
Good, Wallace M., 3 Reidcrest, Kansas City, Kan. 1948.
Goodding, Leslie N., Rt. 1, St. David, Ariz. 1950.
Goodman, Don C., Dept. Zoology, Univ. Illinois, Urbana, Ill. 1952.
Gordon, Sidney P., 424 W. Lincoln, Mangum, Okla. 1948.
Goslin, Robert M., 316 Wilson Ave., Columbus 5, Ohio. 1945.

Goss, Mildred K., Box 90, Mt. Hamilton Rd., San Jose, Calif. 1950.
Gould, Patrick J., 9118 E. Valley Blvd., Rosemead, Calif. 1951.
Gowanloch, James N., Dept. Wildlife and Fisheries, 126 Civil Courts Bldg., New Orleans, La. 1949.
Graf, William, San Jose State College, San Jose, Calif. 1948.
Graham, Mrs. Alva G., 515 El Centro St., South Pasadena, Calif. 1948.
Graham, Hatch, 1106 Hall of Records, Los Angeles 12, Calif. 1937.
Graham, Hatch, Jr., 2742 College Ave., Berkeley 5, Calif. 1949.
Graham, J. Duncan, Benicia High School, Benicia, Calif. 1937.
Grange, Wallace, Sandhill Game Farm, Inc., Babcock, Wis. 1949.
Grant, Adele L., 6019 Overhill Dr., Los Angeles 43, Calif. 1946.
Grater, Russell K., 701 Ave. B, Boulder City, Nev. 1938.
Greeley, Frederick, 15-B Univ. Houses, Eagle Hgts., Madison 5, Wis. 1948.
Green, Augusta L. C., 50 Grange Rd., Cambridge, England. 1947.
Green, Wally, 341 S. Roxbury Ave., Beverly Hills, Calif. 1951.
Greene, Earl R., 418 S. Holt Ave., Los Angeles 48, Calif. 1948.
Greene, Harry C., 1480 Bellwood Rd., San Marino, Calif. 1950.
Greenhalgh, Clifton M., 1230 E. 1st S., Salt Lake City 2, Utah. 1939.
Greer, Edward C., 422 E. 10th St., Davenport, Iowa. 1949.
Griffin, Homer V., Paonia, Colo. 1952.
Griffith, Richard M., Jr., 1201 Virginia Rd., Pasadena 5, Calif. 1944.
Grimm, William C., Rt. 2, Box 95-H, Georgetown, S. C. 1948.
Grinnell, Mrs. Hilda W., 3016 Benvenue Ave., Berkeley, Calif. 1912 (1921) [L.] (1947) [Honorary].
Grinnell, Lawrence I., 710 Triphammer Rd., Ithaca, N.Y. 1949.
Griscom, Ludlow, Museum Comparative Zoology, Cambridge, Mass. 1933 (1949) [L.].
Groner, Dorothy E., 701C Hall of Justice, Los Angeles 12, Calif. 1945.
Groody, Thomas C., 6805 Ridge Rd., Richmond, Calif. 1940.
Grootaers, Frans, de Lignestraat 12, Heverlee-Louvain, Belgium. 1952.
Gross, Alfred O., 11 Boody St., Brunswick, Me. 1923.
Grube, George E., Gettysburg College, Gettysburg, Pa. 1947.
Gudmundsson, Finnur, P. O. Box 532, Reykjavik, Iceland. 1951.
Guest, Mrs. Marjorie L., 380 National Ave., Chula Vista, Calif. 1942.
Guggolz, Jack, 669 38th St., Richmond, Calif. 1940.
Guhl, A. M., Dept. Zoology, Kansas State College, Manhattan, Kan. 1949.
Gullion, Gordon W., 624 Ave. I, Boulder City, Nev. 1947.
Gumbart, William B., P. O. Box 1936, New Haven 9, Conn. 1952.
Gunn, Mrs. Arthur R., 401 E. Sycamore Ave., El Segundo, Calif. 1949.

H

Hachisuka, The Marquess, Atami Shizuoka Ken, Tokyo, Japan. 1928.
Hadley, Thomas E., 306 S. Saginaw St., Holly, Mich. 1947.
Hagar, Mrs. Clarence W., Rt. 1, Box 356, Tigard, Ore. 1951.
Hagar, Mrs. Jack, Rockport, Tex. 1945.
Hague, Florence S., Sweet Briar College, Sweet Briar, Va. 1925.
Hall, Edward M., 7620 S. College, Whittier, Calif. 1937.
Hall, E. Raymond, Museum Natural History, Univ. Kansas, Lawrence, Kan. 1924.
Hall, Fred T., Davenport Public Museum, 704 Brady St., Davenport, Iowa. 1950.
Hall, Leonard, Possum Trot Farm, Caledonia, Mo. 1952.
Halladay, Daniel S., 628 E. Chestnut Ave., Santa Ana, Calif. 1910.
Hæller, Capt. Karl W., AO-864839, 1094th USAF, S. R. S. (Box 33), Sandia Base, Albuquerque, N. M. 1936-41, 1950.
Hallman, Roy C., P. O. Box 435, Port St. Joe, Fla. 1945.
Halloran, Arthur F., P. O. Box 1032, Yuma, Ariz. 1933.
Halstead, Kenneth R., 4137 N. E St., San Bernardino, Calif. 1941.
Halverson, Arthur W., 5705 W. Erie St., Chicago 44, Ill. 1948.
Hamerstrom, Mrs. F[illegible]nces, Plainfield, Wis. 1946.
Hamilton, Charles W., 2639 Fenwood, Houston 5, Tex. 1948.
Hamilton, G. Dale, 2550 Murray St., Shreveport 51, La. 1951.
Hamilton, John B., 800 Hot Springs Rd., Santa Barbara, Calif. 1945.
Hamlett, Paul D., R. F. D. 1, Adams, Tenn. 1949.
Hamlin, John W., 1855 White Oak Dr., Menlo Park, Calif. 1936.
Hamlin, Mrs. Mark L., 6433 Oakwood Dr., Oakland 11, Calif. 1949.
Hammond, Merrill C., Lower Souris Refuge, Upham, N. D. 1949.
Hampe, Irving, E., 5559 Ashborne Rd., Halethorpe P. O., Md. 1938.

Hand, Ralph L., 415 W. Central, Missoula, Mont. 1927 (1950) [L.].

Hann, Harry W., Dept. Zoology, Univ. Michigan, Ann Arbor, Mich. 1949.

Hanna, Wilson C., 721 N. 8th St., Colton, Calif. 1902 (1921) [L.].

Hansen, Charles G., 420 N. 16th St., Corvallis, Ore. 1952.

Hansen, Edward L., 1087 H St., Arcata, Calif. 1952.

Hanson, Elmer C., 1305 Wisconsin Ave., Racine, Wis. 1947.

Hanson, Hugh, Arizona State College, Tempe, Ariz. 1949.

Hanson, James, Box 844, Star Route, Escondido, Calif. 1948.

Hardy, Ross, Long Beach State College, 6201 E. Anaheim Rd., Long Beach 4, Calif. 1938.

Hargrave, Lyndon L., Box 505, Benson, Ariz. 1931.

Harley, Kenneth, L. S., C. S. I. R. O., 598 Affleck St., Albury, N. S. W., Australia. 1947.

Harper, Francis, R. F. D. 1, Mt. Holly, N. J. 1920.

Harris, Harry, 5234 Hermosa Ave., Eagle Rock, Los Angeles 41, Calif. 1914 (1920) [L.] (1950) [Honorary].

Harrison, Ed N., Box B-10, Encinitas, Calif. 1931 (1941) [L.].

Harrison, Hal H., 1102 Highland St., Tarentum, Pa. 1947.

Harrison, Richard E., 313 51st St., New York 22, N.Y. 1948.

Hartman, Frank A., Hamilton Hall, Ohio State Univ., Columbus 10, Ohio. 1945.

Hartman, Willard D., Dept. Zoology, Univ. California, Berkeley 4, Calif. 1950.

Hartung, Esther M., 303 S. Church St., Grass Valley, Calif. 1923.

Harwell, C. A., 2630 Hilgard Ave., Berkeley 9, Calif. 1925.

Hastings, Mrs. Frances S., 3525 Pacific Ave., San Francisco 18, Calif. 1948 (1948) [L.].

Hatch, Grenville, 1548 Wilhelmina Rise, Honolulu 16, T. H. 1952.

Hatton, Mrs. Louise M., Box 200, Calera Canyon Road, Salinas, Calif. 1932.

Havemeyer, Henry O., Mahwah, N. J. 1917.

Haverschmidt, Francois, P. O. Box 644, Paramaribo, Surinam, Dutch Guiana. 1946.

Hawbecker, Albert C., Fresno State College, Fresno 4, Calif. 1936.

Hawkins, Leslie G., P. O. Box 1663, Los Alamos, N. M. 1930-35, 1941.

Hayden, Mrs. Christine B., 924 W. 55th St., Los Angeles 37, Calif. 1950.

Hayman, Robert G., 122 Brown Ave., Carey, Ohio. 1951.

Hayward, C. Lynn, Dept. Zoology, Brigham Young University, Provo, Utah. 1938.

Heaps, Pearl, 1916 Park Ave., Baltimore, Md. 1951.

Hebard, Frederick V., 1500 Walnut St. Bldg., Philadelphia 2, Pa. 1945.

Hebditch, Gerald A., 92 Rydes Hill Rd., Guilford, Surrey, England. 1952.

Hecht, William R., Box 4206, Tower Grove Sta., St. Louis 16, Mo. 1951.

Hedges, Harold C., Rt. 2, Lake Quivera, Kansas City 3, Kans. 1949.

Hefley, Harold M., Div. Biological Sciences, Mississippi Southern College, Box 94, Sta. A, Hattiesburg, Miss. 1945.

Hemphill, Donald V., Rt. 3, Box 215, Corvallis, Ore. 1937.

Henderson, Georgia, 63 Old Forest Hill Rd., Toronto, Ontario, Canada. 1951.

Hendricks, Mrs. Gene T., % C. E. Thompson, 900 S. Robberson Ave., Springfield, Mo. 1949.

Hendricks, Mrs. L. J., 420 Price Ave., Apt. B, Columbia, Mo. 1948.

Henningsen, Mrs. Harold P., 124 Cambridge Way, Piedmont 11, Calif. 1949.

Henrie, Mrs. Esther S., 2130 Leavenworth St., Apt. 6, San Francisco 11, Calif. 1945.

Hensley, M. Max, Dept. Biology, Gettysburg College, Gettysburg 9, Pa. 1952.

Herberger, Joseph T., 959 S. Downing St., Denver 9, Colo. 1949.

Herbst, Lyle C., 10309 La Grange Ave., West Los Angeles 25, Calif. 1951.

Hering, Louise, 568 Marine, Boulder, Colo. 1947.

Herman, Carlton M., Patuxent Research Refuge, Laurel, Md. 1945.

Herrick, F. H., 7816 Amestoy Ave., Van Nuys, Calif. 1952.

Hersey, F. Seymour, Easton, Mass. 1915 (1920) [L.].

Hewitt, Marvin, Greensboro, Md. 1949.

Hiatt, Naomi W., 338 N. Comstock Ave., Whittier, Calif. 1948.

Hick, Edward, 320 Victor St., St. Louis 4, Mo. 1950.

Hickey, Joseph J., 424 Univ. Farm Pl., Madison 5, Wis. 1946.

Hicks, Lawrence E., 8 Chatham Rd., Columbus, Ohio. 1936 (1936) [L.].

Hicks, Thomas W., 5625 Alta St., Jacksonville 6, Fla. 1951 (1952) [L.].

Higgins, Harold G., 2965 S. 14th E., Salt Lake City, Utah. 1943.

Higgins, Thomas F., Box 221, Sound Beach, L. I., N.Y. 1948.

Hildebrand, Milton, 30 Parkside Dr., Davis, Calif. 1947.

Hildinger, Albert E., 1801 Lucile Ave., Los Angeles, Calif. 1952.

Hildreth, Ada L., 4223 67th Ave., Portland 6, Ore. 1951.

Hill, Harold M., 14 Clifton Court, Redlands, Calif. 1935.
Hill, Herbert O., 1811 Bonita, Berkeley, Calif. 1945.
Hill, Mrs. Robert A., 295 Sunkist Lane, Los Altos, Calif. 1950.
Hill, Willis E., Sta. Comm., Base Hq. Sqd., MCAS, El Toro, Santa Ana, Calif. 1944.
Hill, W. W., Dept. Anthropology, Univ. New Mexico, Albuquerque, N. M. 1950.
Hinchman, Richard M., 75 Fairbanks Rd., Milton 86, Mass. 1951.
Hinds, Frank J., Vandercook Hall, Kalamazoo 45, Mich. 1942.
Hinds, Mrs. Garthwaite, 1431 Beech St., South Pasadena, Calif. 1949.
Hinshaw, Thomas D., 1827 San Juan Ave., Berkeley 7, Calif. 1931.
Hipple, Byron T., Jr., 46 Dove St., Albany 10, N.Y. 1951.
Hock, Raymond J., Arctic Health Research Center, P. O. Box 960, Anchorage, Alaska. 1950.
Hodges, James, 324 W. 31st St., Davenport, Iowa. 1948.
Hoffman, Bess M., 1112½ S. Orange Dr., Los Angeles 35, Calif. 1949.
Holdenreid, Robert, Plague Field Study, St. Michael's College, Santa Fe, N. M. 1940.
Holgersen, Holger, Stavanger Museum, Stavanger, Norway. 1952.
Holland, Harold M., Box 615, Galesburg, Ill. 1901 (1920) [L.].
Holliday, Jay N., P. O. Box C, Moorpark, Calif. 1949.
Holton, Mrs. Charles W., Essex Fells, N. J. 1947.
Hood, Mary V., 138 S. Wilton Dr., Los Angeles 4, Calif. 1940.
Hooper, David C., Box 251, College, Alaska. 1951.
Hoover, Theodore J., Davenport, Santa Cruz County, Calif. 1898 (1916) [L.].
Hough, Mrs. John N., % Robert Athearn, 1645 Sunset Blvd., Boulder, Colo. 1947.
Howard, Hildegarde, Los Angeles Museum, Exposition Park, Los Angeles 7, Calif. 1924.
Howard, Walter E., Div. Zoology, Univ. California, Davis, Calif. 1948.
Howe, Elizabeth, 1843 N. Cherokee, Hollywood 28, Calif. 1949.
Howell, A. Brazier, Alna, Me. 1908 (1915) [L.].
Howell, Joseph C., Zoology Dept., Univ. Tennessee, Knoxville, Tenn. 1949.
Howell, Thomas R., Dept. Zoology, Univ. California, Los Angeles 24, Calif. 1947.
Howell, Mrs. Thomas R., 405 Beloit Ave., Los Angeles 49, Calif. 1951.
Howes, Paul G., Bruce Museum, Bruce Park, Greenwich, Conn. 1951.
Howsley, L. R., R. D. 1, Box 83-A, Fort Bragg, Calif. 1927.
Hoy, Nelson D., 500 Sharon Ave., Sharon Hill, Pa. 1944.
Hubbard, Douglass H., Yosemite National Park, Calif. 1937.
Hubbs, Carl L., Scripps Inst. Oceanography, La Jolla, Calif. 1945.
Huble, Jan, 2321 Blake St., Berkeley 4, Calif. 1952.
Hudson, George E., 303 Side St., Pullman, Wash. 1952.
Huey, Laurence M., Natural History Museum, Balboa Park, San Diego 1, Calif. 1909 (1916) [L.].
Hughes, Wallace, 624 S.W. 51st St., Oklahoma City, Okla. 1947.
Hughes, William M., 8755 S.W. Marine Dr., Vancouver, B. C., Canada. 1949.
Humphrey, Philip S., Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1950.
Hundley, Marion L., P. O. Box 43, Granville, Ohio. 1951.
Hungate, J. W., Eastern Washington College of Education, Cheney, Wash. 1924.
Hunn, John T. S., 1218 Prospect Ave., Plainfield, N. J. 1939.
Huntington, Charles E., 38 Killdeer Rd., Hamden 14, Conn. 1951.
Hurd, Paul D., Jr., 112 Agr. Hall. Univ. California, Berkeley 4, Calif. 1940.
Hurley, John B., 401 S. 17th Ave., Yakima, Wash. 1921.
Hutchinson, Mrs. Elverta G., R. R. 4, Box 176, Loveland, Ohio. 1952.
Hutchinson, Mrs. Magdeleine C., 2640 Glendessary Lane, Santa Barbara, Calif. 1940.
Hyde, A. Sidney, Western State College, Gunnison, Colo. 1939.
Hyde, Mrs. Charles H., 12745 Gravelley Lake Dr., S.W., Tacoma, Wash. 1951.

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Ingersoll, Albert M., 908 F St., San Diego, Calif. 1895 (1932) [Honorary].
Ingles, Lloyd G., Biology Dept., Fresno State College, Fresno, Calif. 1936.
Irving, James G., Jr., 631 Albin St., Teaneck, N. J. 1947.
Isaac, Donald E., 4117 Potrero Ave., Apt. 1-A, Richmond 6, Calif. 1948.
Isham, Henry W., 460 Bellefontaine St., Pasadena, Calif. 1947.

J

Jackson, Hartley H. T., Rm. 61, U. S. National Museum, Washington 25, D. C. 1921.
Jacobs, E. Bryan, Waynesburg, Pa. 1947.
Jacobsen, Eric C., P. O. Box 233, Ripon, Calif. 1950.
Jacot, Edouard C., 99 Fairway Rd., Santa Barbara, Calif. 1923.

Jaeger, Edmund C., Riverside College, Riverside, Calif. 1922.
Jahn, Frances F., 10241 Chrysanthemum Lane, Los Angeles 24, Calif. 1948.
James, Douglas A., Vivarium Bldg., Champaign, Ill. 1947.
Jamieson, Robert H., 761 West St., Reno, Nev. 1949.
Jaques, Francis L., 610 W. 116th St., New York 27, N.Y. 1927-28, 1945.
Jefcoat, Arthur W., Inskop P. H., Paynes Creek, Calif. 1937 (1948) [L.].
Jeffrey, Robert G., Rt. 1, Box 517 A, Stanwood, Wash. 1948.
Jenkins, Hubert O., 2116 3rd Ave., Sacramento 17, Calif. 1933.
Jenkins, William J., P.O. Box 7, Olanta, S.C. 1951.
Jenks, Randolph, 2146 E. 4th St., Tucson, Ariz. 1931.
Jensen, Leroy, 5185 Trask St., Oakland 1, Calif. 1946.
Jeter, Horace H., 4534 Fairfield Ave., Shreveport, La. 1950 (1951) [L.].
Jewett, Stanley G., 1404 Bidwell St., S.E., Portland 2, Ore. 1909 (1949) [Honorary].
Jobin, Leo, Williams Lake, B.C., Canada. 1951.
Johnson, A.W., % Katz Johnson, S.A.C. Casilla 327, Santiago de Chile. 1951.
Johnson, Francis N., 111 Church St., Salinas, Calif. 1952.
Johnson, H.V., 972 W. Broadway, Eugene, Ore. 1947.
Johnson, Myrtle E., 4647 55th St., San Diego 5, Calif. 1908.
Johnson, Ned K., 624 Lake St., Reno, Nev. 1950.
Johnson, Ray R., Jr., P.O. Box 685, Arcata, Calif. 1950.
Johnson, Robert A., 98 East St., Oneonta, N.Y. 1945.
Johnston, David W., Dept. Zoology, Univ. California, Berkeley 4, Calif. 1949.
Johnston, Richard F., Museum Vertebrate Zoology, Berkeley 4, Calif. 1947.
Johnston, Verna R., 1812 W. Sonoma Ave., Stockton, Calif. 1943.
Jones, Fred L., Independence, Calif. 1950.
Jones, George R., 11160 Fleetwood St., Sun Valley, Calif. 1950.
Jones, John C., 5810 Namakagan Rd., Washington 16, D.C. 1940.
Jones, Joseph C., 3430 81st St., Jackson Heights, New York, N.Y. 1949.
Jones, S. Paul, 509 West Ave., N., Waukesha, Wis. 1929.
Jorae, Irene F., 6015 Arnold, Mt. Pleasant, Mich. 1945.
Jory, Mrs. Stafford L., 1370 Euclid Ave., Berkeley 8, Calif. 1936.
Jupe, William N., 3450 Primera Ave., Hollywood 28, Calif. 1948.

K

Kalmbach, Edwin R., 2654 Forest St., Denver 7, Colo. 1923.
Keating, John A., 3031 Balboa St., San Francisco 21, Calif. 1947.
Keating, Paul J., 6802 S. Lawrence St., Tacoma 9, Wash. 1952.
Keating, Ralph W. M., 3031 Balboa St., San Francisco 21, Calif. 1951.
Kebless, Peter, 162 Van Winkle Ave., Garfield, N.J. 1947.
Keely, Josiah, Box 383, Huntington, L.I., N.Y. 1948.
Keeton, Luther F., 26 N. Belvedere, Memphis 4, Tenn. 1944.
Keller, Charles E., 637 Eastern Ave., Indianapolis 1, Ind. 1951.
Kellogg, Louise, 672 15th St., Oakland 12, Calif. 1911 (1927) [L.].
Kellogg, Mildred, 2232 Piedmont Ave., Berkeley 4, Calif. 1921.
Kelly, Grace B., 1306 Bayview Pl., Berkeley 8, Calif. 1950.
Kelly, Mrs. Junea W., 1311 Grand St., Alameda, Calif. 1918 (1949) [L.].
Kenaga, Eugene E., 1629 Isabella Rd., Rt. 5, Midland, Mich. 1951.
Kendeigh, S. Charles, Vivarium Bldg., Univ. Illinois, Wright and Healy Sts., Champaign, Ill. 1932.
Kent, Wyatt A., 815 S. Irolo St., Los Angeles 5, Calif. 1940.
Kenyon, Karl W., 2725 Montlake Blvd., Seattle 2, Wash. 1934 (1950) [L.].
Kersey, Mrs. Glen B., 647 Gordor Terr., Chicago 13, Ill. 1951.
Kessel, Brina, Univ. Alaska, College, Alaska. 1951.
Killpack, Merlin L., Roosevelt, Utah. 1950.
Kimsey, J. Bruce, 5033 V St., Sacramento, Calif. 1947.
Kincaid, Edgar B., Jr., 702 Park Pl., Austin, Tex. 1949.
Kingery, Hugh E., 2350 Colorado Blvd., Denver 7, Colo. 1951.
Kinsey, Eric C., Box 76, Manor, Calif. 1933.
Kirscher, William K., Box 346, Sacramento 2, Calif. 1950.
Klein, Richard P., R.D. 4, Jackson Rd., Cragrin Falls, Ohio. 1947.
Kline, Fred, 1039 39th St., Los Angeles 37, Calif. 1942.
Knight, Howard, Weber College, Ogden, Utah. 1952.
Knorr, Owen A., Rt. 1, Box 53, Boulder, Colo. 1950.

Knox, Lucy R., 2000 California St., Apt. 406, San Francisco 9, Calif. 1951.

Kobayashi, Keisuke, No. 2, 1-chome, Shinohara Kitamachi, Nada-ku (Rokko), Kobe, Japan. 1952.

Koford, Carl B., 123 Purdue Ave., Berkeley 8, Calif. 1939 (1944) [L.].

Kortright, Francis H., 633 Eastern Ave., Toronto, Canada. 1945.

Kraak, W. K., Bussum, Josef Israelslaan 14, Netherlands. 1952.

Kraus, Douglas L., State College, Kingston, R. I. 1935.

Krehbiel, Adolph J., 221 Jefferson St., Clayton, N. M. 1951.

Kroll, Mrs. Zerifa S., 608 W. Locust St., Lodi 3, Calif. 1948.

Krug, Bruce A., P. O. Box 405, Chesley, Ontario, Canada. 1945.

Krutzsch, Philip H., Museum Natural History, Univ. Kansas, Lawrence, Kan. 1947.

Kunkle, Donald E., 29 Edgewood Rd., Bloomfield, N. J. 1952.

Kuroda, Nagamichi, No. 1 Fukuyoshi-cho, Akasaka, Minato-ku, Tokyo, Japan. 1951.

Kyllingstad, Henry C., Box 592, Brigham City, Utah. 1944.

L

Laing, Charles C., 762 N. Van Buren St., Milwaukee 2, Wis. 1949.

Laing, Hamilton M., Comox, B. C., Canada. 1926.

Lamb, Chester C., Escobeda 69, Irapuato, Guanajuato, Mexico. 1899.

Lancaster, Douglas A., 1437 8th St. S., Fargo, N. D. 1952.

Lane, Arnold, 2010 Hickory St., Santa Ana, Calif. 1947.

Langstroth, James H., P. O. Box 1130, Silver City, N. M. 1922.

Larrison, Earl J., Dept. Biological Sciences, Univ. Idaho, Moscow, Ida. 1943.

Larson, Enid A., Box 2841, Carmel, Calif. 1952.

Larson, Mervin W., 2440 River Dr., Stockton, Calif. 1949.

Laskey, Mrs. Amelia R., 1521 Graybar Lane, Nashville 12, Tenn. 1933.

Lasky, William R., 551 26th St., Santa Monica, Calif. 1948.

Lastreto, C. B., 605 Market St., San Francisco 5, Calif. 1913 (1948) [L.].

Latta, Katherine, 430 W. Moreland Ave., Philadelphia 18, Pa. 1952.

Laughlin, Robert M., Drake's Corner Rd., Princeton, N. J. 1952.

Lawrence, George E., 129 Columbus St., Bakersfield, Calif. 1947.

Leader, Harold, 2830 Motor Ave., Los Angeles 34, Calif. 1945.

Leavens, Mrs. Robert F., 1900 Yosemite Rd., Berkeley 7, Calif. 1928.

Lee, Levon, Rt. 1, Box 21-A, Santa Fe, N. M. 1941.

Leitch, Mrs. Mary S., 1875 Greenfield Ave., Los Angeles 25, Calif. 1929.

Lelande, Harry J., 2657½ San Marino St., Los Angeles 6, Calif. 1901.

Lemieux, Louis, 144 Grande-Allee, Apt. 46, Quebec, P. Q., Canada. 1951.

Lengemann, Martha A., 360 Cedar St., Imlay City, Mich. 1951.

Leopold, A. Starker, Museum Vertebrate Zoology, Univ. California, Berkeley 4, Calif. 1938.

Leupold, Norbert, 3555 S. E. Insley, Portland 2, Ore. 1951.

Lewis, Mrs. Alice H., 212 N. Wilton Pl., Los Angeles 4, Calif. 1950.

Lewis, Harrison F., West Middle Sable, Shelburne County, N. S., Canada. 1946.

Lieftinck, John E., % Goodyear, S. A., Luxembourg City, Luxembourg. 1947.

Ligon, J. Stokley, P. O. Box 950, Carlsbad, N. M. 1914.

Lincoln, Frederick C., Fish and Wildlife Service, Dept. Interior, Washington 25, D. C. 1922.

Lindau, S. Paul, 108 N. Harvard Blvd., Los Angeles, Calif. 1940.

Linford, James B., 538 Fairbanks Ave., Oakland 10, Calif. 1949.

Linsdale, Jean M., Jamesburg Rt., Robles del Rio, Calif. 1926.

Linsley, Richard, 5550 Poplar Blvd., Los Angeles 32, Calif. 1948.

Linton, M. Albert, 315 E. Oak Ave., Moorestown, N. J. 1947.

Little, Luther, Casa Lomita, Rt. 1, Box 21-E, Littlerock, Calif. 1913 (1920) [L.].

Livermore, John W., 135 E. 54th St., New York, N.Y. 1940.

Lloyd, Hoyes, 582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 1923.

Locke, Louis, Box 33, Lockeford, Calif. 1948.

Lockwood, Frank F., The Shoals, 1601 S. Coast Blvd., Laguna Beach, Calif. 1939.

Lockwood, Robert M., Veterans Admin. Hospital, McKinney, Tex. 1948.

Loetscher, Frederick W., Jr., 507 W. Main St., Danville, Ky. 1950.

Lofberg, Mrs. Lila McK., Star Route, Isabella, Calif. 1925.

Long, Mrs. Albert E., 45 Clarendon Ave., San Francisco 14, Calif. 1951.

Longenecker, Phil, 38 Canterbury Court, Toledo 6, Ohio. 1947.

Longhurst, William M., Univ. California Field Sta., Box 305, Hopland, Calif. 1939.

Loring, George G., 1737 Cambridge St., Cambridge, Mass. 1951.

Lory, Daisy M., 497 Forest St., Oakland 9, Calif. 1936.

Lovell, Harvey B., 3011 Meade Ave., Louisville 13, Ky. 1951.
Lovett, Constance, 1461 Alice St., Oakland 12, Calif. 1951.
Low, Seth H., R. D. 2, Gaithersburg, Md. 1948 (1951) [L.].
Lowe, Charles H., Jr., Dept. Zoology, Univ. Arizona, Tucson, Ariz. 1950.
Lower, Bill R., 9225 Sideview Dr., Rivera, Calif. 1947.
Lowery, George H., Jr., Box 316, Louisiana State Univ., Baton Rouge, La. 1938.
Luckan, Louise A., 250 S. Wilton Pl., Los Angeles 41, Calif. 1948.
Lukens, Cmdr. R. R., 8205 Victoria Ave., Riverside, Calif. 1951.
Lukens, William W., Jr., Upper Gulph Rd., Radnor, Pa. 1947.
Lunk, William A., 2849 Whitewood, Pittsfield Village, Ann Arbor, Mich. 1948.
Luther, Clarence H., East Center St., Fayetteville, Ark. 1908-25, 1943.
Lynch, Jack, 926 Halladay, Santa Ana, Calif. 1949.
Lyon, Carleton B., 2736 Outpost Dr., Hollywood 28, Calif. 1949.

M

MacCarthy, Hubert R., 1006 W. 19th St., North Vancouver, B. C., Canada. 1951.
MacCaughey, Vaughan, 726 Cragmont Ave., Berkeley 8, Calif. 1952.
MacDonald, Kenneth F., 2912 S. E. 75th Ave., Portland 6, Ore. 1947.
MacFayden, Clifford J., 60 Montgomery Ave., Toronto 12, Ontario, Canada. 1949.
Macgregor, Wallace G., Jr., 1318 Shattuck Ave., Berkeley, Calif. 1947.
Mack, Horace G., % Gilson Mfg. Co., Ltd., Guelph, Ontario, Canada. 1945.
MacKay, Ronald H., Dept. Zoology, Univ. British Columbia, Vancouver, B. C., Canada. 1952.
MacKenzie, Locke, 829 Park Ave., New York 21, N.Y. 1947.
Maclean, R. Bruce, 2149 Panorama Terr., Los Angeles 26, Calif. 1947.
MacNeill, C. Donald, 753 S. 43rd St., Apt. 1-R, Richmond, Calif. 1949.
MacMillan, Mrs. Jeannette C., 3557 Eden Ave., Cincinnati 29, Ohio. 1952.
Maddox, Claire R., 21807 S. Grace St., Torrance, Calif. 1950.
Mahan, Mrs. Margaret P., 4127 W. 62nd St., Los Angeles 43, Calif. 1942.
Mailliard, Ernest C., 8 Cooper Lane, Sausalito, Calif. 1909.
Mair, Eileen L., International House, Rm. Y-40, Berkeley 4, Calif. 1952.
Mall, Ralph, 2306 Harcourt Ave., Los Angeles 16, Calif. 1948.
Mallette, Robert D., 1748 Wright St., Pomona, Calif. 1948.
Mann, Mrs. Lila M., 2632 Sichel St., Los Angeles 31, Calif. 1951.
Manning, Thomas H., 37 Linden Terr., Ottawa 1, Ontario, Canada. 1951.
Mannix, Mrs. Lucille M., 11424 Cedar Rd., Apt. E-2, Cleveland, Ohio. 1948.
Marfield, George R., 1820 S. Olive Ave., Alhambra, Calif. 1945.
Margolin, Abe S., Dept. Biology, Phoenix College, Phoenix, Ariz. 1948.
Marionneaux, Mrs. Alice S., Ingenio Ofelina, Aguadulce, Republica de Panama. 1947.
Markle, Jess M., 917 Sierra St., Madera, Calif. 1943.
Marks, Jack L., City of Portland Zoo, 400 S. W. Kingston Ave., Portland 1, Ore. 1951.
Marshall, Arthur P., P. O. Box 1067, Morro Bay, Calif. 1932.
Marshall, David B., Box 415, Fallon, Nev. 1946.
Marshall, Joe T., Jr., Dept. Zoology, Univ. Arizona, Tucson, Ariz. 1936.
Marshall, Perry R. F., P. O. Box 1199, Santa Barbara, Calif. 1948.
Matheson, Jean E., 229 Pomona Ave., El Cerrito 8, Calif. 1951.
Mathews, Frank P., Rt. 6, Box 308, Olympia, Wash. 1950.
Mayer, William V., Dept. Zoology, Univ. Southern California, Los Angeles 7, Calif. 1951.
Mayfield, Harold F., 2557 Portsmouth Ave., Toledo 12, Ohio. 1947.
Mayhew, Wilbur W., 707 7th St., Davis, Calif. 1946.
Mayr, Ernst, American Museum Natural History, New York 24, N.Y. 1933.
Mazzeo, Rosario, 120 Elm St., North Cambridge 40, Mass. 1946.
McAllister, Mrs. Oscar, 129 York Dr., Piedmont 11, Calif. 1950.
McAllister, Thomas H., Jr., 6306 N. E. Hoyt St., Portland 13, Ore. 1948.
McAndrew, Harry J., Oxford Hall, 2140 Oxford St., Berkeley, Calif. 1947.
McCabe, Robert A., 424 University Farm Pl., Madison 5, Wis. 1947.
McCarty, John D., Jr., 1020 E. 21st St., Oakland, Calif. 1952.
McClure, Howe E., 1336 Richmond, El Cerrito, Calif. 1947.
McCormick, Ralph B., Box 706, Arcata, Calif. 1948.
McCoy, Edward C., Santa Maria Inn, Santa Maria, Calif. 1923.
McCulloch, Norman B., Jr., 2013 Glenwood Ave., Raleigh, N. C. 1951.
McCune, Mrs. Glenn, 707 Lark Court, Los Angeles 65, Calif. 1952.
McDonald, Mrs. James R., 1042 Chestnut St., San Francisco, Calif. 1927 (1927) [L.]

McDowell, Samuel B., Jr., Dept. Zoology, Columbia University, New York 27, N.Y. 1948.
McElroy, Mildred, 404 Gladstone Blvd., Shreveport, La. 1948.
McFadyen, J. Ross, Apt. 301, 224 E. 15th St., Oakland 6, Calif. 1949.
McGranahan, Miss Marjorie, Box 838, Folsom, Calif. 1952.
McGregor, May, 1580 N. Florida St., Banning, Calif. 1950.
McIntosh, William B., 3523 Edgewood, Pittsfield Village, Ann Arbor, Mich. 1945.
McIntyre, Mrs. Grace, Devil's Tower, Wyo. 1951.
McKnight, Edwin T., 5038 Park Pl., Friendship Sta., Washington 16, D.C. 1936.
McLean, Donald D., 2455 Cottle Ave., San Jose 25, Calif. 1916.
McManus, William R., Memramcook, New Brunswick, Canada. 1931.
McMillan, Eben, Cholame, Calif. 1946.
McMillan, Ian I., Shandon, Calif. 1945.
McNab, Brian, 2216 E. Burnside St., Portland, Ore. 1951.
McQueen, Lawrence B., 212 S. 4th St., Mifflinburg, Pa. 1951.
McQuesten, Leavitt M., 120 Otis St., Santa Cruz, Calif. 1951.
Medcalf, Robert W., 1431 S.W. Park Ave., Apt. 102, Portland 1, Ore. 1948.
Mees, Martin, Koningen Emmaplein 7, Rotterdam, Netherlands. 1952.
Mein, William W., III, 1308 Canada Rd., Woodside, Calif. 1950.
Meinhardt, Hans, 1925 Makiki St., Honolulu, T.H. 1948.
Mellinger, Enos O., Fish and Wildlife Service, Chincoteague National Wildlife Refuge, Box 62, Chincoteague, Va. 1947.
Meng, Heinz K., 116 Miller St., Ithaca, N.Y. 1945 (1950) [L.]
Mengel, Jane S., 20 E. Shore Dr., Whitmore Lake, Mich. 1948.
Menninger, Phil B., 1724 Collins Ave., Topeka, Kan. 1948.
Mercedes, Sister, Cabrini Villa Academy, 7505 W. Glenoaks Blvd., Burbank, Calif. 1947.
Merkel, Mrs. Nancy M., P.O. Box 892, Paso Robles, Calif. 1950.
Merkel, Terrence J., 2050 Fell St., San Francisco 17, Calif. 1950.
Merrill, Anne, 81 Beachview Crescent, Toronto 13, Canada. 1947.
Mers, William H., 1659 Marlowe Ave., Cincinnati 24, Ohio. 1951.
Metcalf, Homer N., Dept. Horticulture, Montana State College, Bozeman, Mont. 1945.
Meugens, Arthur L., 2636 Forbes St., Victoria, B.C., Canada. 1944.
Mewaldt, L. Richard, Dept. Zoology, Washington State College, Pullman, Wash. 1947.
Meyer, James B., Jr., 4523 Firmament Ave., Encino, Calif. 1949.
Meyerriecks, Andrew J., Box 4251, Univ. Tennessee, Knoxville, Tenn. 1948.
Meyers, Ernest G., 2637 W. Euclid, Stockton, Calif. 1946.
Michener, Josephine R., 418 N. Hudson Ave., Pasadena 4, Calif. 1934 (1942) [Honorary].
Mickey, Arthur B., 1516 Rainbow Ave., Laramie, Wyo. 1947.
Miller, Alden H., Museum Vertebrate Zoology, Berkeley 4, Calif. 1923 (1949) [L.].
Miller, August W., 310 Haskell St., Gridley, Calif. 1950.
Miller, Daniel J., 728 Shepard St., San Pedro, Calif. 1948.
Miller, June C., 159 Melville Ave., Palo Alto, Calif. 1951.
Miller, Loye H., Univ. California, Los Angeles 24, Calif. 1905 (1936) [Honorary].
Miller, Ralph H., 337 E. Bonnie Brae Court, Ontario, Calif. 1942.
Miller, Robert C., California Academy of Sciences, Golden Gate Park, San Francisco 18, Calif. 1921.
Miller, W. Thomas, 1809 Bushnell Ave., South Pasadena, Calif. 1937.
Mills, Mrs. Monta A., 1091 Bush St., Spr. 312, San Francisco, Calif. 1952.
Milwain, Margaret J., 731 Alma Ave., Oakland 10, Calif. 1948.
Minturn, W. B., 2840 Mariposa St., Fresno 1, Calif. 1945.
Mitchell, George J., 3282 W. 8th Ave., Vancouver, B.C., Canada. 1949.
Mitchell, Mrs. Osborne, % Cobast, Caixa Postal 4965, Rio de Janeiro, Brazil. 1949.
Mitchell, Verda, 8220 S.W. 3rd Ave., Portland 1, Ore. 1951.
Mitchell, Viola J., 20 W. Vine, Stockton, Calif. 1950.
Mitchell, Walton I., 398 Vassar Ave., Berkeley 8, Calif. 1909.
Mocine, Ralph F., 2341 Cove Ave., Los Angeles 26, Calif. 1941.
Mock, Ronald M., 4247 Sutre St., Los Angeles 43, Calif. 1948.
Moeller, B. A., 489 Prospect Terr., Pasadena 3, Calif. 1935.
Moncrief, J. Edwin, 2745 E. 8th St., National City, Calif. 1952.
Moncrieff, Mrs. Perrine, "The Cliffs," Nelson, New Zealand. 1948.
Monk, Harry C., 406 Avoca St., Nashville 5, Tenn. 1925.
Monroe, Burt L., Ridge Rd., Anchorage, Ky. 1947.
Monson, Gale, P.O. Box 1717, Parker, Ariz. 1936.
Montrello, J. George, 10851 Wilkins Ave., Los Angeles 24, Calif. 1952.

Moody, Marjorie J., 10965 National Blvd., Los Angeles 64, Calif. 1946.
Moody, Rollen W., 612 Harrison St., Denver 6, Colo. 1951.
Moore, Donald C., 26 Prospect Dr., Redlands, Calif. 1944.
Moore, Donald W., 801 8th Pl., China Lake, Calif. 1949.
Moore, Mrs. MacBrayer, 335 W. Lexington St., Danville, Ky. 1951.
Moore, Robert T., 582 Meadow Grove Pl., Pasadena 3, Calif. 1911 (1947) [L.] (1950) [Honorary].
Moran, Robert B., 437 S. Hill St., Los Angeles 13, Calif. 1901.
Morejohn, Gonzalo V., Jr., R. F. D. 1, Box 26, Davis, Calif. 1946.
Morrish, Will F., 239 Glorietta Blvd., Orinda, Calif. 1951.
Morrow, Florence, P. O. Box 944, Carmel, Calif. 1948.
Morrow, Mrs. John, 1320 N. State St., Chicago 10, Ill. 1947.
Morton, Erle D., 4110 E. Cooper St., Tucson, Ariz. 1942.
Moser, E. Randolph, 470 E. Washington St., Apt. D, Pasadena 6, Calif. 1948.
Moser, R. Allyn, R. F. D. 1, Benson Sta., Omaha 4, Nebr. 1940.
Mossman, Archie S., 119 Merrill Crest Dr., Madison 5, Wis. 1950.
Mowbray, M. Vincent, 1383 40th St., Los Alamos, N. M. 1937.
Mudge, Edmund W., Jr., 5926 Averill Way, Preston Hollow, Dallas 5, Tex. 1945.
Mueller, Frank D., 49 Radford Ave., Toronto, Ontario, Canada. 1951.
Mueller, Helmut C., 2756 N. Palmer St., Milwaukee 12, Wis. 1950.
Mulford, Alice S., 2823-D 11th Ave., Oakland 10, Calif. 1933.
Munger, Osgood H., 2755 S. W. Buena Vista Dr., Portland 1, Ore. 1951.
Munro, George C., 3029 Hibiscus Dr., Honolulu 15, T. H. 1945-48, 1951.
Munro, J. A., Okanagan Landing, B. C., Canada. 1914.
Murdock, James, 311 Irving Ave., Glendale 1, Calif. 1938.
Murie, Adolph, Moose, Wyo. 1935.
Murie, Olaus J., Moose, Wyo. 1913.
Murphy, Joseph R., 913 H St., Lincoln 8, Nebr. 1951.
Murray, George, 827 Beech St., Redwood City, Calif. 1950.
Murray, J. Laurence, P. O. Box 311, Compton, Calif. 1939.
Myers, Mabel A., 617 W. Center St., Anaheim, Calif. 1922.

N

Naumburg, Mrs. Walter W., American Museum Natural History, 77th St. and Central Park West, New York 24, N.Y. 1922.
Necker, Walter L., Rt. 3, Box 211-A, Chesterton, Ind. 1946.
Neff, Johnson A., Wildlife Research Laboratory, Bldg. 8, Denver Federal Center, Denver, Colo. 1920.
Neff, Mitchell T., P. O. Box 128, Kentfield, Marin Co., Calif. 1939.
Neil, Richard W., 218 Garfield St., San Francisco 12, Calif. 1942.
Neldam, Mrs. George, 304 La Espiral, Orinda, Calif. 1949.
Nelson, Arnold L., 3256 Van Hazen St., N. W., Washington 15, D. C. 1932.
Nelson, Gideon E., Jr., Dept. Biology, Univ. Florida, Ganiesville, Fla. 1951.
Nelson, Roy A., 423 W. G St., Oakdale, Calif. 1925.
Nelson, Mrs. Roy F., 650 Blair Ave., Piedmont 11, Calif. 1947.
Nelson, Theodora, 315 E. 68th St., New York 21, N.Y. 1940.
Newton, Earl T., 5145 Swope Parkway, Kansas City 4, Mo. 1942.
Nice, Mrs. Margaret M., 5725 Harper Ave., Chicago 37, Ill. 1921 (1950) [L.].
Nichols, Charles K., 212 Hamilton Rd., Ridgewood, N. J. 1936.
Nichols, John T., American Museum Natural History, New York 24, N.Y. 1909.
Nichols, Mrs. Mary J., Rt. 6, Box 685, Tucson, Ariz. 1939.
Nichols, Walter F., 2437 Lambert Dr., Pasadena 8, Calif. 1938.
Nicholson, Donald J., 1224 Palmer St., Orlando, Fla. 1911.
Nickell, Walter P., Cranbrook Institute of Science, Bloomfield Hills, Mich. 1947.
Neilsen, Mrs. Beatrice W., Rt. 1, Box 808, Kauffman Ave., Red Bluff, Calif. 1931-32, 1942.
Niven, J. P. Mackie, Amanzi, Uitenhage, Union of South Africa. 1952.
Noack, Harry R., 309 MacArthur Blvd., Oakland 10, Calif. 1901.
Nokes, I. D., 300 W. 121st St., Los Angeles 61, Calif. 1914.
Norman, Edward, Box 221, Deerfield, Mass. 1951.
Norris, Robert A., Museum Vertebrate Zoology, Ber'.eley 4, Calif. 1949.
Norris, Russell T., 50 Milk St., Newburyport, Mass. 1944.
Norton, Peter, 115 Alpine Terr., Oakland 18, Calif. 1946.
Novaes, Fernando da Costa, Aptd. 303, Rua Toneleiros 186, Rio de Janeiro, Brazil. 1951.

O

Oberholser, Harry C., 2933 Berkshire Rd., Cleveland Heights, Cleveland 18, Ohio. 1904.

O'Connor, Esther L., 4344 Locust, Kansas City 4, Mo. 1946.

O'Connor, Francis J., 321 Chester St., Glendale, Calif. 1948.

Odlum, Gordon C., Triple Island Light Station, Dept. of Transport, Box 999, Prince Rupert, B. C., Canada. 1948.

Odom, Mrs. Edgar R., P. O. Box 458, Orange, Tex. 1951.

Oliphant, Mrs. Alice M., Bacteriology Dept., Life Sciences Bldg., Univ. California, Berkeley 4, Calif. 1950.

Olson, Andrew C., Jr., San Diego State College, San Diego 5, Calif. 1940.

Olson, Eugene A., Rt. 2, Box 52, Fresno, Calif. 1950.

Olson, Leo B., 835 S. 1st St., De Kalb, Ill. 1951.

O'Neil, Mrs. Norah S., 1311 Bonham St., Commerce, Tex. 1951.

Ono, Masayuki, % Central Tokyo P. O., Box 950, Chiyoda-ku, Tokyo, Japan. 1951.

Oppmann, Paul H., 13330 Detroit Ave., Lakewood, Ohio. 1950.

Orr, Mary T., Box 183, Reserve, N. M. 1946.

Orr, Robert T., California Academy of Sciences, Golden Gate Park, San Francisco 18, Calif. 1931.

Orth, Robert E., 153 Grand Ave., Box C, Elsinore, Calif. 1951.

Owen, Virgil W., Julian, Calif. 1896.

Owre, Oscar, Jr., 2625 Newton Ave., S., Minneapolis 5, Minn. 1937.

P

Paine, Robert T., III, 2 Hubbard Park, Cambridge 38, Mass. 1950.

Painton, Harry R., 3545 Foothill Rd., Santa Barbara, Calif. 1893-97, 1936 (1947) [Honorary].

Painton, Mrs. Harry R., 3545 Foothill Rd., Santa Barbara, Calif. 1941 (1951) [L.].

Palmer, Fletcher G., 1611 Vejar St., Westmont, R. F. D. 2, Pomona, Calif. 1942.

Palmer, Ralph S., New York State Museum, Albany 1, N.Y. 1951.

Palmer, Theodore S., 1939 Biltmore St., N. W., Washington, D. C. 1904 (1920) [L.]. (1928) [Honorary].

Park, Charles F., Jr., 636 Alvarado Row, Stanford, Calif. 1947.

Parker, Clarence J., 821 N. Garfield Ave., Alhambra, Calif. 1938.

Parker, Dean R., Dept. Biology, Univ. Mississippi, University, Miss. 1945.

Parker, Margueritte D., 821 N. Garfield Ave., Alhambra, Calif. 1950.

Parkes, Kenneth C., Laboratory of Ornithology, Fernow Hall, Ithaca, N.Y. 1947.

Parmalee, Paul W., Dept. Biol., Austin State Coll., Nacogdoches, Tex. 1951.

Paroni, Clelia, 575 Vincente Ave., Berkeley 7, Calif. 1952.

Parsons, Robert P., Rt. 1, Box 252, Carmel, Calif. 1951.

Partin, J. L., 10650 Rochester Ave., Los Angeles 24, Calif. 1930.

Patrick, Leon, P. O. Box 636, Oceanside, Calif. 1931.

Patterson, John E., 2300 Siskiyou Blvd., Ashland, Ore. 1948.

Patterson, Mrs. O. M., Box 2, Pima, Ariz. 1950.

Patterson, Mrs. Theresa H., 544 S. El Molino Ave., Pasadena, Calif. 1926 (1926) [L.].

Paul, Lucius H., Riverview Pl., Rochester 8, N.Y. 1913.

Paulson, Richard E., Dept. Zoology, Univ. Chicago, Chicago 37, Ill. 1948.

Payne, Donald E., Rt. 4, Box 169, Hood River, Ore. 1946.

Payne, Everitt V., 18152 LeMay St., Reseda, Calif. 1951.

Paynter, Raymond A., Jr., Kent Dr., Hamden 14, Conn. 1946.

Pearse, Theed, Comox, Vancouver Island, B. C., Canada. 1927.

Pearson, Oliver P., Museum Vertebrate Zoology, Berkeley 4, Calif. 1948.

Pemberton, J. R., 714 W. Olympic Blvd., Los Angeles 15, Calif. 1900 (1928) [L.] (1949) [Honorary].

Pequegnat, Willis E., Zoology Dept., Pomona College, Claremont, Calif. 1937.

Perley, Mrs. Lyman O., 520 S. 31st St., No. 8, Omaha, Nebr. 1927 (1927) [L.].

Perring, Louise, 4821 Cedar Ave., Philadelphia, Pa. 1949.

Peterson, George W., Box 725, Nogales, Ariz. 1950.

Peterson, James G., 3801 Blackford Ave., San Jose, Calif. 1934.

Peterson, Roger T., P. O. Box 7, Glen Echo, Md. 1939.

Petrishin, Mrs. Mabel H., 1465 21st Ave., San Francisco, Calif. 1949.

Pettingill, Olin S., Jr., Dept. Zoological Sciences, Carleton College, Northfield, Minn. 1934 (1948) [L.].

Peyton, Laurence G., R. D. 2, Fillmore, Calif. 1909 (1922) [L.].

Peyton, Sidney B., R. D. 2, Fillmore, Calif. 1913 (1922) [L.].

Phelps, Frank M., 312 5th St., Elyria, Ohio. 1912.

Phelps, James H., 429 E. Carter St., Pocatello, Ida. 1944.

Phelps, William H., Apartado 2009, Caracas, Venezuela. 1941.

Phelps, William H., Jr., Apartado 2009, Caracas, Venezuela. 1951.
Phillips, Allan R., 113 Olive Rd., Tucson, Ariz. 1933 (1948) [L.].
Phillips, William B., 155 E. 82nd St., New York 28, N.Y. 1951.
Pickering, Robert, 66 Menno St., Waterloo, Ontario, Canada. 1952.
Pierce, Fred J., Winthrop, Iowa. 1948.
Pierce, Robert A., Nashua, Iowa. 1945.
Piercy, J. E., Denman Island, B.C., Canada. 1949.
Pister, E. Philip, Rt. 1, Box 215, Stockton, Calif. 1949.
Pitelka, Frank A., Museum Vertebrate Zoology, Berkeley 4, Calif. 1940.
Piternick, George, 1634 Oxford St., Berkeley 9, Calif. 1951.
Platford, Sidney D., 4166 5th Ave., Los Angeles 43, Calif. 1935.
Plymell, Florence, 1865 California St., San Francisco 9, Calif. 1950.
Poole, Cecil A., 1764 Topeka Ave., San Jose 11, Calif. 1941.
Porter, Eliot F., Rt. 1, Box 33, Santa Fe, N.M. 1946.
Porter, Richard D., 3130 Ogden Ave., Ogden, Utah. 1949.
Porter, Sydney, The White Gates, 149 Stenson Rd., Derby, England. 1949.
Potter, Mrs. George C., 2111 Malvern Rd., Charlotte 7, N.C. 1951.
Pough, Richard H., 33 Highbrook Ave., Pelham 65, N.Y. 1926.
Poyser, Florence, Box 1, Boulder City, Nev. 1952.
Pratt, Helen S., 2451 Ridge View Ave., Los Angeles 41, Calif. 1920-38, 1940.
Pray, Russell H., 662 Santa Rosa Ave., Berkeley 7, Calif. 1948.
Preble, Edward A., 3027 Newark St., Washington 8, D.C. 1926.
Prescott, Kenneth W., U.S. Naval Prep. School, U.S.N.T.C., Bainbridge, Md. 1947.
Presnall, Clifford C., 5315 Earlston Dr., Washington 16, D.C. 1931.
Price, John B., 532 Alvarado Row, Stanford Univ., Calif. 1926.
Price, Ruth M., 5255 Glasgow Way, Los Angeles 45, Calif. 1942.
Pringle, Cornelia C., 1816 Vallejo St., San Francisco, Calif. 1915 (1921) [L.].
Pritchard, C. G., Wildlife Bldg. Fair Ground, Lincoln, Nebr. 1947.
Provin, Bruce F., 1316 Shattuck Ave., Berkeley 4, Calif. 1948.
Pruitt, Ben H., Rt. 2, Box 33, Springfield, Ore. 1947.
Pulich, Warren M., 539 Ave. L, Boulder City, Nev. 1941.
Pursell, William M., 511 Neilson St., Berkeley 7, Calif. 1926.
Putman, William L., Dom. Entomological Lab., Vineland Sta., Ontario, Canada. 1947.
Pyle, Robert L., 1143 21st St., Santa Monica, Calif. 1950.

Q

Quaglino, Jack, 14330 Sunset Blvd., Pacific Palisades, Calif. 1950.
Quaintance, Charles W., Eastern Oregon College of Education, La Grande, Ore. 1934.
Quattlebaum, W. D., 1925 Paloma St., Pasadena 7, Calif. 1927-36, 1945.
Quay, T. L., Zoology Dept., North Carolina State College, Raleigh, N.C. 1943.
Quay, Wilbur B., Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1947.
Quigley, Raymond, Jr., 2741 Barry Ave., Los Angeles 64, Calif. 1937.
Quinsey, Robert L., 10315 Viretta Lane, Los Angeles 24, Calif. 1944.

R

Racey, Kenneth, 6542 Lime St., Vancouver, B.C., Canada. 1934.
Raitt, Thomas M., 264 Eugenia Dr., Ventura, Calif. 1951.
Ramey, Ralph E., Jr., 1140 W. Ashby Pl., San Antonio, Tex. 1952.
Ramsay, Alfred O., McDonogh School, McDonogh, Md. 1951.
Rand, Robert W., % Union Govt., Guano Islands, 32 Riebeck St., Capetown, S. Africa. 1947.
Randall, Clarence B., 38 Dearborn St., Chicago 3, Ill. 1951.
Randolph, Evan, Cor. Seminole and Chestnut Aves., Philadelphia 18, Pa. 1951.
Rankin, Herbert E., 5215 Vantage Ave., North Hollywood, Calif. 1949.
Ranson, Maud B., Box 557, Portland 7, Ore. 1952.
Ransob. Webster H., 9676 N.E. 9th St., Vuecrest, Bellevue, Wash. 1921.
Rapp, William F., Jr., 1219 Ivy St., Crete, Nebr. 1941.
Rausch, Robert L., U.S. Public Health Service, Box 960, Anchorage, Alaska. 1952.
Ray, Mrs. Milton S., 171 San Benito Way, San Francisco 27, Calif. 1948.
Raymond, Francis, 1029 Cliff Dr., P.O. Box 2371, Laguna Beach, Calif. 1950.
Read, Bayard W., Upper Dogwood Lane, Rye, N.Y. 1949.
Reed, Richard H., 4039 E. Fairmont Ave., Tucson, Ariz. 1947.
Reeder, Wm. G., 4725 Brynhurst Ave., Los Angeles 43, Calif. 1946.
Rehfisch, Carol, 335 Delgado St., Santa Fe, N.M. 1951.

Reichert, Mrs. R. J., 14 W. 1st St., Mt. Vernon, N.Y. 1950.
Reidsma, Harry J., 100 N. Mansfield Ave., Los Angeles 36, Calif. 1952.
Reis, C. O., 646 Juanita Ave., Los Angeles 4, Calif. 1917.
Renetzky, Andrew, 846 Higuera St., San Luis Obispo, Calif. 1949.
Ressequie, Laurence J., 98 Ramona Ave., Piedmont, Calif. 1951.
Rett, E. Z., Museum Natural History, Santa Barbara, Calif. 1937.
Reuther, Ronald, Wildlife Research Unit, Univ. Arizona, Tucson, Ariz. 1946.
Reynolds, Harold C., Museum Vertebrate Zoology, Berkeley 4, Calif. 1946.
Reynolds, T. Eric, 140 Estates Dr., Piedmont 11, Calif. 1934.
Reynolds, Mrs. T. Eric, 140 Estates Dr., Piedmont 11, Calif. 1940.
Rice, Mrs. Bertha M., P. O. Box 1147, San Jose, Calif. 1949.
Rice, Richard D., 239 Congress Ave., Rochester 11, N.Y. 1951.
Rich, C. Selwyn, 114 Charpin Pl., Alhambra, Calif. 1919-22, 1939.
Richardson, Carl, Trail, Ore. 1925.
Richardson, Mrs. Ethel E., 887 Indian Rock Ave., Berkeley 7, Calif. 1941.
Richardson, Frank, Dept. Zoology, Univ. Nevada, Reno, Nev. 1935.
Richardson, Walter L., Rt. 3, Box 812, Porterville, Calif. 1943.
Richdale, Lancelot E., 23 Skibo St., Kew, Dunedin, New Zealand. 1944.
Richmond, Stanley M., 331 Eugene Medical Center Bldg., Eugene, Ore. 1951.
Richter, Carl H., 703 Main St., Oconto, Wis. 1948.
Rigby, Mrs. Douglas, Sedona, Ariz. 1951.
Riley, Thomas J., Box 6, Brandywine Sta., Schenectady 4, N.Y. 1951.
Riney, Thane, 18612 Crest Ave., Hayward, Calif. 1942.
Roberts, Bert H., 6951 33rd St., N.W., Washington 15, D.C. 1947.
Roberts, Mrs. Frances F., 1134 Glendon Ave., Los Angeles 24, Calif. 1942 (1943) [L.].
Roberts, Mrs. Helen G., 4415 Clarissa Ave., Hollywood 27, Calif. 1947.
Robertson, D., Jr., Endiang, Alberta, Canada. 1949.
Robertson, Howard, 157 Wilton Dr., Los Angeles 4, Calif. 1896 (1926) [L.] (1949), [Honorary].
Robertson, John McB., 1677 W. 9th St., Pomona, Calif. 1913 (1949) [Honorary].
Robertson, Mrs. John McB., 1677 W. 9th St., Pomona, Calif. 1921.
Rockefeller, William A., Rm. 2610, 52 Wall St., New York 5, N.Y. 1952.
Rodia, Alfred, Rt. 1, Box 252-A, Delhi, Calif. 1952.
Roddis, Richard S. L., 4420 Braeburn Rd., San Diego 4, Calif. 1944.
Rodgers, Thomas L., Chico State College, Chico, Calif. 1937.
Rodock, Roy E., Northern Idaho College of Education, Lewiston, Ida. 1945.
Roesler, M. Stuart, June Road, Cos Cob, Conn. 1949.
Roest, A. I., Zoology Dept., Oregon State College, Corvallis, Ore. 1947.
Rogers, Mrs. Caroline W., 1029 Vallejo St., Santa Rosa, Calif. 1938.
Rogers, Irl, 402 Alturas Ave., Modesto, Calif. 1935.
Rogers, Irma, 258 Valle Vista, Monrovia, Calif. 1939.
Rogers, Wallace, 715 Ellsworth Dr., N.W., Atlanta, Ga. 1952.
Ronkin, Elizabeth P., Dept. Biological Sciences, Univ. Delaware, Newark, Del. 1949.
Ronkin, Raphael R., Dept. Biological Sciences, Univ. Delaware, Newark, Del. 1947.
Rooney, James, Jr., 1514 S. 12th Ave., Yakima, Wash. 1948.
Rosa, Mildred B., Rt. 1, Box 134, 275 Hillcrest Dr., Encinitas, Calif. 1948.
Ross, Aaron B., 3562 Porter, Ogden, Utah. 1947.
Ross, C. Chandler, 7924 Lincoln Dr., Philadelphia 18, Pa. 1948.
Ross, Hollis T., 29 S. 2nd St., Lewisburg, Pa. 1936.
Ross, Roland C., 1820 Bushnell Ave., South Pasadena, Calif. 1920.
Roth, Edgar S., 107 N. Fuller St., Los Angeles, Calif. 1949.
Roullard, Fred P., 1015 Weldon Ave., Fresno 4, Calif. 1949.
Rowley, John S., 403 S. 1st St., Alhambra, Calif. 1928.
Rubey, William W., 16 Westwood Dr., Washington 16, D.C. 1949.
Rudd, Clayton G., 315 Medical Arts Bldg., Minneapolis 2, Minn. 1945 (1949) [L.].
Rudd, Robert L., Museum Vertebrate Zoology, Berkeley 4, Calif. 1939.
Rudkin, Francis H., Jr., 458 Fillmore St., Fillmore, Calif. 1950.
Ruffner, Albert B., 1072 Trestle Glen, Oakland, Calif. 1950.
Russell, Ward C., Museum Vertebrate Zoology, Berkeley 4, Calif. 1930.
Rustad, Orwin A., Dept. Biology, St. Olaf College, Northfield, Minn. 1952.
Rycraft, Thomas M., 427 E. 3rd St., Watsonville, Calif. 1950.
Ryder, Ensign Ronald A., USS Algol (AKA-54) F.P.O., San Francisco, Calif. 1949.
Ryker, Harrison, 6015 Contra Costa Rd., Oakland 18, Calif. 1950.

S

Sabine, Winifred S., 503 Triphammer Rd., Ithaca, N.Y. 1949.
Salt, George W., Div. Zoology, Univ. California, Davis, Calif. 1947.
Sampson, Walter B., 1005 N. San Joaquin St., Stockton 18, Calif. 1901.
Sams, James R., 4348 Hilldale Rd., San Diego 4, Calif. 1944.
Samuels, David L., 500 Walsh Rd., Atherton, Calif. 1952.
Sanchez-Mejorada, Carlos, Jr., Montes Urales 632, Lomas de Chapultepec, Mexico City, Mexico. 1948.
Sanders, Earl, Howard Payne College, Brownwood, Tex. 1946.
Sanders, Ellen A., R.R. 4, Campbellsville, Ky. 1948.
Sanderson, Clarence H., 3 4th St., Oneida, N.Y. 1951.
Sather, Carlyle, 1290 Grove St., Apt. 204, San Francisco 17, Calif. 1952.
Saugstad, N. Stanley, Rt. 4, Minot, N.D. 1948.
Saunders, Aretas A., Box 141, Canaan, Conn. 1909.
Savage, James, Buffalo Athletic Club, Buffalo, N.Y. 1937.
Schaefer, Hugh F., 825 Merchants Rd., Rochester 9, N.Y. 1946.
Schmidt, Thomas B., 3700 Sharon St., Harrisburg, Pa. 1948.
Schneider, Fred A., % Warren Dried Fruit Co., San Jose, Calif. 1893 (1949) [Honorary].
Schneider, Walter N., 157 Van Tassel Court, Oakland, Calif. 1949.
Schnitzer, Albert, 922 Lakeside Pl., Elizabeth 3, N.J. 1952.
Schoenborn, Harry, Rt. 1, Box 164, Molalla, Ore. 1950.
Schoenert, Dick, 1021 El Vecino, Modesto, Calif. 1949.
Scholes, Robert T., Bushnell, Ill. 1948.
Schorger, A.W., 168 N. Prospect Ave., Madison 5, Wis. 1928.
Schreiner, Keith M., Ollie, Iowa. 1951.
Schultz, Mrs. Robert, 22809 W. 53rd Ave., Edmonds, Wash. 1951.
Schulz, Kenneth R., 4008 Rhoda Ave., Oakland 2, Calif. 1949.
Schumm, William G., 302 C St., La Porte, Ind. 1945.
Schuster, Robert O., 3932 Ardley Ave., Oakland 2, Calif. 1945.
Schwartz, Charles W., 131 Forest Hill, Jefferson City, Mo. 1951.
Schwartz, Paul, Apartado 1766, % York Venezuela, Caracas, Venezuela. 1952.
Schwilling, Marvin, Box 864, Garden City, Kan. 1950.
Scott, Mrs. Dorothy D., 1508 La Loma Ave., Berkeley 8, Calif. 1936.
Scott, Frederic R., 4600 Coventry Rd., Richmond 21, Va. 1947.
Scott, Mrs. Harriet E., 2741 Woolsey St., Berkeley 5, Calif. 1942.
Scott, Henry C., Box 1888, Stanford Univ., Calif. 1949.
Scott, Oliver K., 437 E. 13th St., Casper, Wyo. 1952.
Scott, Walter, Hotel Embassy, 851 South Grand Ave., Los Angeles 14, Calif. 1947.
Sebastian, Mrs. Irene, 3613 W. 23rd St., Los Angeles 16, Calif. 1938.
Seeber, Edward L., 1654 5th Ave., Huntington 3, West Va. 1946.
Sefton, J. W., Jr., San Diego Trust and Savings Bank, Box 1871, San Diego 12, Calif. 1923.
Sehl, Robert H., 7027 Hegerman St., Philadelphia 35, Pa. 1952.
Seibert, Henry C., Ohio Univ., Athens, Ohio. 1947.
Seibert, Milton L., Jr., 906 N. 4th St., San Jose 11, Calif. 1937.
Selander, Robert K., Museum Vertebrate Zoology, Univ. California, Berkeley 4, Calif. 1948.
Selle, Raymond M., 1562 Munson Ave., Los Angeles 42, Calif. 1936-41, 1948.
Severaid, J. Harold, Dept. Life Sciences, Sacramento State College, Sacramento 18, Calif. 1946.
Seymour, Peter O., 304 Village Court, San Jose, Calif. 1951.
Shaftesbury, Archie D., Dept. Zoology, Woman's College Univ. North Carolina, Greensboro, N.C. 1945.
Shaub, Benjamin M., 159 Elm St., Northampton, Mass. 1948.
Shaw, Catherine D., 7142 Marshfield Way, Hollywood 46, Calif. 1951.
Shaw, Charles R., 1113 Milam St., Pineville, La. 1949.
Shearer, Amon R., Box 428, Mont Belvieu, Chambers County, Tex. 1928.
Sheffler, Dorothy E., 4731 Angeles Vista Blvd., Los Angeles 43, Calif. 1949.
Sheffler, W. J., 4731 Angeles Vista Blvd., Los Angeles 43, Calif. 1930 (1937) [L.].
Shelton, Leonard A., 313 First National Bank Bldg., Pomona, Calif. 1945.
Shepard, Frank P., Jr., Meadow Lane, Greenwich, Conn. 1951.
Sherman, George L., Upper Lake, Calif. 1946.
Sherwood, John W., 105 Smith St., Salinas, Calif. 1923.
Shomate, Mrs. C. Howard, 55B Rodman St., China Lake, Calif. 1950.
Shufeldt, Robert W., P.O. Box 642, Las Vegas, N.M. 1948.
Sibley, Charles G., Dept. Natural Sciences, San Jose State College, San Jose 14, Calif. 1938.
Sibley, Gretchen, 4721 9th Ave., Apt. 3, Los Angeles 43, Calif. 1950.

Simmons, Edward M., % E. A. McIlhenny, Avery Island, La. 1943. (1943) [L.]
Simmons, Mrs. William, 2742 N. Maryland Ave., Milwaukee 11, Wis. 1945.
Simpson, Roxie C., 6624 1st St., N.W., Washington 12, D.C. 1948.
Sims, Mrs. R. M., 36 Hillcrest Rd., Berkeley 5, Calif. 1933.
Singleton, Albert R., 3968 Marburg Ave., Cincinnati 9, Ohio. 1949.
Skillen, Donald R., 530 Georgian Rd., Pasadena 2, Calif. 1927.
Skinner, Milton P., 438 Locust Ave., Long Beach 2, Calif. 1915 (1920) [L.].
Skutch, Alexander F., San Isidro del General, Costa Rica, C.A. 1944.
Small, Arnold, 1829 N. Western Ave., Los Angeles 27, Calif. 1949.
Smalley, Jack A., 1891 Dennison St., Pomona, Calif. 1952.
Smith, Mrs. Anna M., 107 Alexander Ave., Box 507, Larkspur, Calif.
Smith, Clarence F., 2623 Virginia St., Berkeley 4, Calif. 1928.
Smith, Edward W., Rt. 3, Box 698, Oregon City, Ore. 1951.
Smith, Emily D., Rt. 1, Box 387, Los Gatos, Calif. 1921.
Smith, Josephine E., 51 Canyon Rd., Berkeley 4, Calif. 1928.
Smith, Loris P., 2560 61st Ave., Oakland 4, Calif. 1930.
Smith, Minnie M., P.O. Box 452, Polson, Mont. 1948.
Smith, Robert J., 443 S. Madison Ave., La Grange, Ill. 1950.
Smith, Robert L., Rt. 1, Reynoldsville, Pa. 1947.
Smith, Thomas A., 843 Indian Rock Ave., Berkeley 7, Calif. 1942.
Smith, W. Glen, Box 240, Little Mt. Camp, Vancouver, B.C., Canada. 1952.
Smith, X. Martin, B.O.Q., C-20, N.O.T.S., Inyo-kern, China Lake, Calif. 1948.
Snell, Charles H., 4915 48th Ave., Red Deer, Alberta, Canada. 1926.
Snow, Mrs. Angeline W., Rt. 2, Box 460, Los Gatos, Calif. 1950.
Snyder, L. L., Royal Ontario Museum, 100 Queens Park, Toronto 5, Ontario, Canada. 1924.
Soloman, Philip, 416 N. Bedford Dr., Beverly Hills, Calif. 1949.
Sooter, Clarence A., U.S.P.H.S., P.O. Box 1132, Greeley, Colo. 1945.
Sowls, Lyle K., Co-op Wildlife Res. Unit, Univ. Arizona, Tucson, Ariz. 1951.
Speirs, Mrs. Doris H., "Cobble Hill," R.R. 2, Pickering, Ontario, Canada. 1945.
Spellar, Mrs. J. B., Pebble Beach, Calif. 1948.
Sprick, Mrs. George B., 215 Santa Fe Ave., Hamden 14, Conn. 1951.
Sprinkle, Charles R., Chinook, Mont. 1936.
Staebler, Arthur E., W. H. Kellogg Bird Sanctuary, Augusta, Mich. 1945.
Stafford, Douglas D., 912 Grand St., Alameda, Calif. 1948.
Stager, Kenneth E., Los Angeles County Museum, Exposition Park, Los Angeles 7, Calif. 1935.
Stallcup, William B., Museum Natural History, Univ. Kansas, Lawrence, Kan. 1951.
Stanley, Emerson W., P.O. Box 131, Garden Grove, Calif. 1935-38, 1946.
Stanley, Harold A., 2642 E. 222nd St., Long Beach 10, Calif. 1952.
Stanley, Willard F., State Teachers College, Fredonia, N.Y. 1948.
Starrett, Andrew, P.O. Box 112, Storrs, Conn. 1951.
Stauffer, James M., Haugen, Wis. 1952.
Stebbins, Robert C., 1814 Delaware St., Berkeley 3, Calif. 1939.
Steele, Paul H., P.O. Box 935, Sacramento, Calif. 1947.
Stein, Robert C., St. Olaf College, Northfield, Minn. 1951.
Stensrud, Clyde L., Rt. 1, Box 57, Atchison, Kan. 1947.
Stephenson, Mrs. Paul A., 815 Colfax, Evanston, Ill. 1952.
Stern, Ralph J. A., 305 Clay St., San Francisco 11, Calif. 1952.
Sterne, Mary E., 3027 Benvenue Ave., Berkeley 5, Calif. 1952.
Stettenheim, Peter, Bird Div., Mus. Zoology, Univ. Michigan, Ann Arbor, Mich. 1952.
Steusloff, Ivan, 245 N. 13th St., Salem, Ore. 1944 (1944) [L.].
Stevens, Lawrence, 918 E. Haley St., Santa Barbara, Calif. 1930-31, 1946.
Stevenson, James O., Fish and Wildlife Service, Dept. of Interior, Washington 25, D.C. 1928.
Steward, Orville M., P.O. Box 19, Fordham Branch, Bronx 58, N.Y. 1950.
Stewart, Paul A., 8640 N. State St., Westerville, Ohio. 1930 (1943) [L.].
Stewart, Robert E., Patuxent Research Refuge, Laurel, Md. 1941.
Stillwell, Jerry E., R.F.D. 2, Fayetteville, Ark. 1936.
Stitt, Merle E., 1208 N. Weber, Colorado Springs, Colo. 1951.
Stoddard, H. L., Sherwood Plantation, Rt. 5, Thomasville, Ga. 1914.
Stoerman, Frank A., 1721½ Westport Ave., Kansas City 2, Mo. 1952.
Stone, Edgar N., 55 Almaden Court, San Francisco, Calif. 1947.
Stone, Ned W., 2418 California St., Berkeley 3, Calif. 1939.
Stoner, Emerson A., Box 444, Benicia, Calif. 1918.

Storer, Robert W., Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1941.
Storer, Tracy I., Div. Zoology, Univ. California, Davis, Calif. 1910.
Stott, Ken W., Jr., Zoological Society San Diego, Box 551, San Diego 12, Calif. 1941.
Stout, O. Milton, 358 N. Norton Ave., Los Angeles 4, Calif. 1950.
Stowell, Mrs. Ellery C., 670 Santa Rosa Ave., Berkeley 7, Calif. 1949.
Strahan, Anna M., P. O. Box 293, Fort Klamath, Ore. 1951.
Straw, Richard M., 973 W. County Rd. B., St. Paul 8, Minn. 1948.
Streator, Clark P., 127 Otis St., Santa Cruz, Calif. 1919 (1952) [Honorary].
Street, Phillips B., Exton, Pa. 1948.
Street, Thomas M., 1435 Campus Dr., Berkeley 8, Calif. 1952.
Strehlow, Elmer W., 520 E. Montana St., Milwaukee 7, Wis. 1945 (1946) [L.].
Stringham, Emerson, Box 986, Kerrville, Tex. 1944.
Stuebgen, Mrs. Sophie, 48 Highgate Rd., Berkeley 8, Calif. 1952.
Sturgeon, Jack, 5th and Alcazar, Arlington, Wash. 1936.
Sturges, Franklin W., 350 Ocean Ave. Ext., Santa Monica, Calif. 1951.
Suffel, G. Shumway, 1105 N. Holliston Ave., Pasadena 6, Calif. 1926.
Sullivan, Mrs. Paul M., 969 5-mile Line Rd., Webster, N.Y. 1949.
Sumner, Lowell, % National Park Service, 180 New Montgomery St., San Francisco 5, Calif. 1924.
Suthard, James G., 1881 Raymond Ave., Long Beach 6, Calif. 1938.
Sutton, George M., Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1924.
Sweeney, R. D., 460 N. Las Palmas, Los Angeles 4, Calif. 1949.

T

Taber, Richard D., 6035 Park Ave., Richmond, Calif. 1947.
Taber, Wendell, 3 Mercer Circle, Cambridge, Mass. 1935.
Talmadge, Robert R., P. O. Box 71, Willow Creek, Calif. 1939.
Tanner, Vasco M., Brigham Young Univ., Provo, Utah. 1919.
Tapia, Guillermo J., Apartado Postal No. 2616, Mexico 12, D. F., Mexico. 1952.
Tashian, Richard E., Biology Dept., Long Island University, Brooklyn 1, N.Y. 1951.
Taylor, Lewis W., Poultry Div., Univ. California, Berkeley 4, Calif. 1931.
Taylor, Lois C., 1615 La Vereda Rd., Berkeley 4, Calif. 1946.
Taylor, Robert L., 810 Highland Dr., Pasadena 2, Calif. 1944.
Taylor, Walter P., 424 W. Harrison St., Claremont, Calif. 1905.
Teachenor, Dix, 1020 W. 61st St., Kansas City 2, Mo. 1922.
Teale, Edwin W., 93 Park Ave., Baldwin, L. I., N.Y. 1947.
Terres, John K., 345 E. 57th St., New York 22, N.Y. 1947.
Terry, Mrs. Anne B., 1940 Waverly St., Palo Alto, Calif. 1937.
Terry, Edward P., 2586 Aberdeen, Los Angeles 27, Calif. 1948.
Test, Frederick H., Dept. Zoology, Univ. Michigan, Ann Arbor, Mich. 1936.
Tevis, Lloyd P., Jr., Box 1416, Carmel, Calif. 1940.
Thatcher, Vernon E., 210 Beatty St., Medford, Ore. 1945.
Thomas, Evelyn H., 407 East Pasadena, Apt. 1, Pomona, Calif. 1940.
Thomas, Gerald B., 5519 Ruthelen, Los Angeles 37, Calif. 1949.
Thompson, Laurence J., 225½ Manhattan Beach Blvd., Manhattan Beach, Calif. 1951.
Thompson, Mrs. Myrtle, 260 Orange St., San Bernardino, Calif. 1938.
Thomson, David H., 1485 Foothill Blvd., San Luis Obispo, Calif. 1948.
Thomson, Isabel A., 5939 Shafter Ave., Oakland 8, Calif. 1919.
Thomsson, Sylvia L., 56 Avon Rd., Berkeley 7, Calif. 1952.
Thornburg, Ashley A., 306 Hot Wells Blvd., San Antonio 10, Tex. 1949.
Thornburg, Mrs. R. J., Rt. 2, Box 665, Tucson, Ariz. 1952.
Thorne, Oakleigh, II, Box 347, Islip, L. I., N.Y. 1947.
Throckmorton, Michael, 812 4th St., Lewiston, Ida. 1947.
Tillotson, Daniel F., 239 Colusa Ave., El Cerrito, Calif. 1943.
Tinkham, Ernest R., P. O. Box 306, Indio, Calif. 1942.
Todd, David W., III, 1815 Magnolia Way, Walnut Creek, Calif. 1951.
Todd, Henry O., Jr., 106 E. Main St., Box 259, Murfreesboro, Tenn. 1946.
Tomich, P. Quentin, Hastings Reservation, Jamesburg Rt., Robles del Rio, Calif. 1943.
Tordoff, Harrison B., Museum Natural History, Univ. Kansas, Lawrence, Kans. 1951.
Towe, J. Tray, Rt. 5, Box 143, Mt. Airy, N. C. 1952.
Trask, Parker D., 240 Southhampton Ave., Berkeley 7, Calif. 1934.
Trautman, Milton B., Franz Theodore Stone Laboratory, Put-in-Bay, Ohio. 1946.

Traylor, Melvin A., Jr., Chicago Natural History Museum, Chicago 5, Ill. 1950.
Triechel, George, Jr., 887 Indian Rock, Berkeley, Calif. 1950.
Trost, Henry, 2344 Ulloa St., San Francisco, Calif. 1924.
Troxell, Mrs. Inez D., 636 Coventry Rd., Berkeley 8, Calif. 1933.
Tubb, John A., Fisheries Dept., Sandakan, Colony of North Borneo. 1948.
Tucker, Mrs. Carll, Mt. Kisco, N.Y. 1927 (1931) [L.].
Tucker, Donald J., 103 N. Ballston Ave., Scotia 2, N.Y. 1951.
Tufts, Harold F., Port Mouton, Queens County, N. S., Canada. 1948.
Twisselman, Carl F., Box 75, McKittrick, Calif. 1946.
Twisselman, William H., 415 Capitol St., Salinas, Calif. 1935.
Twomey, Arthur C., Carnegie Museum, Pittsburgh, Pa. 1952.
Tyler, John G., Box 173, Fresno, Calif. 1905 (1920) [L.].
Tyler, Winsor M., 1482 Commonwealth Ave., Brighton 35, Mass. 1914.

U

Uhler, Francis M., Fish and Wildlife Service, Patuxent Research Refuge, Laurel, Md. 1928.
Unglish, W. E., 345 N. Rosanna St., Gilroy, Calif. 1910.
Unterkircher, Blanche L., 4537½ W. 11th Pl., Los Angeles 6, Calif. 1948.
Urabec, John H., 931 Micheltorena St., Los Angeles 26, Calif. 1951.

V

Vaiden, Merritt G., Rosedale, Miss. 1945.
Vance, H. R., Terrace, B. C., Canada. 1952.
Van Deusen, Hobart M., 12 Highland Ave., Montclair, N. J. 1940.
Vane, Robert F., 600 Dows Bldg., Cedar Rapids, Iowa. 1948.
Van Fleet, Clark C., Box 696, Lakeport, Calif. 1941.
Van Laar, Henry, 18657 Ingomar St., Reseda, Calif. 1945.
Van Scyoc, Evelyn, 456 Van Buren, Oakland, Calif. 1950.
Van Tyne, Josselyn, Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1931.
Vaughan, William C., Locust Grove Farm, River Rd., Youngstown, N.Y. 1945.
Verges, Eugene M., II, 1126 Beacon St., Brookline 46, Mass. 1931.
Vessel, M. F., San Jose State College, San Jose, Calif. 1950.
Vietor, Mrs. Vera, % Acme Foundry, Eureka, Calif. 1944.
Voge, Marietta, Dept. Zoology, Univ. California, Los Angeles 24, Calif. 1949.
Von Bloeker, Jack C., Jr., Dept. Life Sciences, Los Angeles City College, Los Angeles 29, Calif. 1927 (1950) [L.].
Von Hafften, Paul R., 220 Golden Gate Ave., San Francisco 2, Calif. 1950 (1951) [L.].
Vowels, William G., 5046 Greenbush Ave., Van Nuys, Calif. 1940.

W

Wade, Otis H., 1806 Redesdale, Los Angeles 26, Calif. 1949.
Wagner, George, 7215 Shore Rd., Brooklyn 9, N.Y. 1944.
Wagner, Mrs. H. J., 818 E. Boulder St., Colorado Springs, Colo. 1951.
Walker, Alex, Rt. 2, Box 190, Tillamook, Ore. 1911.
Walker, Charles F., Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1942.
Walker, Ernest P., Apt. 404, 3016 Tilden St., N. W., Washington 8, D. C. 1910.
Walker, Kenneth M., 3224 N. 20th St., Tacoma 7, Wash. 1947.
Walkinshaw, Lawrence H., 1703 Central National Tower, Battle Creek, Mich. 1934 (1949) [L.].
Walsh, David, Univ. Alaska, Box 1, College, Alaska. 1951.
Walters, James M., Dept. Zoology, Univ. California, Los Angeles 24, Calif. 1951.
Walters, Roland D., Box 148, La Sierra Station, Arlington, Calif. 1950.
Wanzer, James O., 3601 56th St., Sacramento 17, Calif. 1922.
Ware, Georgie, 14170 Fox St., San Fernando, Calif. 1949.
Warner, Dwain W., Museum Natural History, Univ. Minnesota, Minneapolis 14, Minn. 1949.
Warters, Mary E., 5115 Woodland Ave., Des Moines 12, Iowa. 1949.
Washington, Mrs. Whiting, North Edgecomb, Me. 1948.
Watson, Frank G., Shell Chemical Corp., Box 2633, Houston 1, Tex. 1934.
Webb, William G., 11014 Eldora, Sunland, Calif. 1936.
Weber, Orlando F., Jr., Willowlake, Fishkill, N.Y. 1936.
Webster, J. Dan, Hanover College, Hanover, Ind. 1942.
Weedmark, Clara S., 1151½ W. 29th St., Los Angeles 7, Calif. 1951.
Weise, Charles M., Vivarium Bldg., Univ. Illinois, Urbana, Ill. 1952.
Weiser, Charles S., Wyndham Hills, York, Pa. 1920.
Wells, Oliver N., Edenbank Farm, Sardis, B. C., Canada. 1946.

Wentz, John H., 5026½ Carlton Way, Hollywood 28, Calif. 1952.
Wernicke, Mrs. Maleta M., Gull Point, near Pensacola, Fla. 1945.
Werning, Joseph R., 224 N. 26th St., Corvallis, Ore. 1951.
Westfall, Jane A., 918 Hough St., Lafayette, Calif. 1950.
Weston, Henry G., Jr., Dept. Biology, Grinnell College, Grinnell, Iowa. 1943.
Wetherbee, David K., 11 Dallas St., Worcester 8, Mass. 1947.
Wetmore, Alexander, U.S. National Museum, Washington, D.C. 1909 (1927) [L.].
Weydemeyer, Winton, Fortine, Mont. 1926.
Wheatland, Sarah B., 85 Sachem St., New Haven, Conn. 1948.
Whitaker, Mrs. Lovie M., % John Whitaker, School of Journalism, Univ. Oklahoma, Norman, Okla. 1948.
Whitcomb, Pemberton, 130 Cedar St., New York 6, N.Y. 1951.
White, George C., 250 S. Orange Grove Ave., Pasadena 2, Calif. 1948.
Whitehead, James, Mt. Tamalpais State Park, Mill Valley, Calif. 1951.
Whitelock, Loran M., 118 N. Westmoreland Ave., Los Angeles 4, Calif. 1949.
Whitney, Nathaniel R., Jr., Qtrs. 1505, Apt. A, Robins Air Force Base, Ga. 1945.
Wiederhoeft, Waldemar L., Gen. Delivery, Ramona, Calif. 1948.
Wiggin, Henry T., 151 Tappan St., Brookline 46, Mass. 1944.
Wiggins, Ira L., Natural History Museum, Stanford Univ., Calif. 1947.
Wilder, Theodore G., 125 Oxford Rd., Waukesha, Wis. 1947.
Williams, A. D., 73 Hazelwood Ave., San Francisco 12, Calif. 1951.
Williams, Mrs. Edna E., Granite Sta., Bakersfield, Calif. 1939.
Williams, George G., The Rice Institute, Houston, Tex. 1947.
Williams, Mrs. Inez A., 73 Hazelwood Ave., San Francisco 12, Calif. 1951.
Williams, Laidlaw O., Rt. 1, Box 138, Carmel, Calif. 1925.
Williams, Laird M., 1710 Arch St., Berkeley 9, Calif. 1948.
Williams, Ralph B., Box 2354, Juneau, Alaska. 1949.
Williams, Raymond E., P.O. Box 191, Hawthorne, Calif. 1950.
Willis, Cornelius G., 1 Carter Ave., Sierra Madre, Calif. 1948.
Willis, John S., P.O. Box 365-M, Pasadena 18, Calif. 1950.
Willits, Mrs. Ethel S., 502 N. Pleasant, Lodi, Calif. 1946.
Wilson, Belle, 304 N. 3rd St., Banning, Calif. 1943 (1948) [L.].
Wilson, Herbert B., 902 Morris Ave., Modesto, Calif. 1945.
Wilson, Mrs. Ida S. DeMay, Box 1517, Avenal, Calif. 1939.
Wilson, Paul T., College of Marin, Kentfield, Calif. 1937.
Wilson, Cmdr. Rowland S., Staff, Amph. Grp. Three, F.P.O., San Francisco, Calif. 1945.
Wilson, Mrs. Russell E., 4548 Farmdale Ave., North Hollywood, Calif. 1951.
Wilson, Wynn A., 817 Green St., Fort Worth 3, Texas. 1951.
Wing, Harold F., 7165 Bunkerhill Rd., Jackson, Mich. 1948.
Wing, Leonard W., Dept. Wildlife Management, Texas A. and M. College, College Station, Tex. 1935.
Winn, Howard E., Museum Zoology, Univ. Michigan, Ann Arbor, Mich. 1948.
Winson, J.W., Box 584, Sumas, Wash. 1925.
Winter, Frank C., 1101 Wilshire Blvd., Los Angeles 17, Calif. 1950.
Winter, Robert, 4671 Harvey Ave., Fresno, Calif. 1952.
Wiseman, Philip K., Jr., 828 Moraga Dr., Apt. 2, West Los Angeles 24, Calif. 1938-41, 1947.
Wisner, Robert L., Scripps Inst. Oceanography, Field Activities, La Jolla, Calif. 1951.
Wohnus, John F., Bennington College, Bennington, Vt. 1939.
Wolfe, Lloyd R., Rt. 1, Kerrville, Tex. 1921.
Wolff, John L., 1549 Central Park Ave., Yonkers 2, N.Y. 1948.
Wolfson, Albert, Dept. Biological Sciences, Northwestern Univ., Evanston, Ill. 1943.
Wong, Herbert, 135 8th St., Oakland 7, Calif. 1949.
Wood, Dale T., 201 Ocean View Dr., Vista, Calif. 1940.
Wood, Merrill, 811 N. Allen St., State College, Pa. 1948.
Wood, Sherwin F., 1015 N. Alexandria Ave., Los Angeles 29, Calif. 1935.
Woodbury, Angus M., 248 University St., Salt Lake City 2, Utah. 1931.
Woodbury, W. Verne, 616 Locust St., Reno, Nev. 1952.
Woods, Robert S., P.O. Drawer 32, Covina, Calif. 1920 (1927) [L.].
Woodside, Davis H., 1602 Mikahala Way, Honolulu, T.H. 1948.
Wool, Albert J., Rt. 2, Box 728, San Jose, Calif. 1942.
Woolfenden, Glen E., S. A. E. Hillcrest, Ithaca, N.Y. 1948.
Woolsey, Ralph A., 5526 Murietta Ave., Van Nuys, Calif. 1947.

Work, Telford H., 2022 Greenberry Rd., Baltimore 9, Md. 1942.
Wright, Curtis, 101 Bonita Ave., Piedmont, Calif. 1915 (1922) [L.]
Wright, John T., Rt. 5, Box 618, Tucson, Ariz. 1936.
Wright, Phillip L., Montana State Univ., Missoula, Mont. 1943.
Wyeth, William M., III, % Wyeth Co., St. Joseph, Mo. 1951.
Wythe, Margaret W., 28 Contra Costa Pl., Oakland 18, Calif. 1912.

Y

Yamashina, Marquis Yoshimaro, 49 Nampeidai-Machi-Shibuya-Ku, Tokyo, Japan. 1952.
Yeager, Lee E., Colorado A. and M. College, Fort Collins, Colo. 1946.
Yocum, Charles F., 11 Harvey Rd., Pullman, Wash. 1945.
Yost, Mrs. Myrtle K., 2831½ N. Broadway, Los Angeles 31, Calif. 1923.
Young, James A., 161 Hazel Dr., Concord, Calif. 1950.
Young, James B., 514 Dover Rd., Louisville 6, Ky. 1942.
Yrizarry, John, 22 Chester Court, Brooklyn 25, N.Y. 1945.

Z

Zahn, Otto J., 2115 Estrella Ave., Los Angeles 7, Calif. 1895 (1946) [L.].
Zander, Mrs. Verna B., % Dr. Donald V. Zander, Dept. Veterinary Medicine, Univ. California, Davis, Calif. 1946.
Zerlang, Lawrence, 524 W. Hawthorne, Eureka, Calif. 1918.
Zimmerman, Mrs. Marion D., 29 Blackford Court, Oakland 11, Calif. 1951.
Zucca, Joseph J., 268 Minerva St., San Francisco 25, Calif. 1951.

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